British Birds

AN ILLUSTRATED MONTHLY JOURNAL

Editors

Stanley Cramp   I. J. Ferguson-Lees
P. A. D. Hollom   E. M. Nicholson

Photographic Editor Eric Hosking

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THREE SHILLINGS AND SIXPENCE

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British Birds

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The 'raptor-flight' of the Cuckoo

By J. S. Ash

On four occasions in the past eleven years I have noticed Cuckoos *Cuculus canorus* flying in a rather unusual manner, and I have incomplete notes on what was probably an earlier case of similar behaviour. This method of flight is presumably the same as that briefly mentioned by Chance (1922, 1940), but I have been unable to trace any other reference to it in an admittedly far from exhaustive search through such books as Armstrong (1947), Baker (1942), Bannerman (1955), Kirkman (1911), Rothschild and Clay (1952) and Witherby *et al.* (1938). This is all the more remarkable because the flight concerned is utterly unlike any normally associated with this species. In fact, the bird so closely resembles a Sparrowhawk *Accipiter nisus* or even a Montagu's Harrier *Circus pygargus* at these times that the term 'raptor-flight' is used here to describe it.

The fact that this flight has been noticed on at least four occasions by an observer who was paying no particular attention to Cuckoos suggests that it is, although perhaps infrequent, at least a regular feature of this bird's behaviour. It seems strange, therefore, that the habit has not been commented on more often by those engaged upon a study of Cuckoos, for, if seen, such unusual behaviour is not likely to be overlooked—unless of course its close resemblance to a raptor's has indeed led the observer into believing that that is what he is seeing.

Probably the best way to describe the raptor-flight is to quote in some detail from the notes made at the time of each observation. In these excerpts from my journals it will be seen that in each case the bird involved was first thought to be either a harrier or a Sparrowhawk. Indeed, the bird seen in 1961 so closely resembled a Sparrowhawk in both outline and behaviour that even after watching it for quite a long time, during which the characteristic shape of the Cuckoo's head and the pale streak on the underwing could clearly be seen, I found it most difficult to convince myself that it was not in fact a hawk. In such

circumstances, even an experienced observer, if he were unaware of this aspect of Cuckoo behaviour, could be excused for passing the bird over as a Sparrowhawk.

(1) 'Portland Bill, Dorset, 27th April 1952. With N. P. Ashmole. At about 15.00 GMT a Cuckoo was seen perched on a bramble; at 17.10 it was again seen flying round the same spot in a very odd manner. In fact at first sight it was thought to be a harrier(!), having a rather slow flapping flight and alternately gliding as it quartered over the same bit of ground. It settled several times and was constantly mobbed by a pair of Meadow Pipits *Anthus pratensis*. At one stage it flew up and circled round at about 100 feet, alternately flapping and gliding (or soaring) for long distances—the striking feature being the extended and separated (fingered) primaries, the first looking as if it were considerably extended forward. It finally settled and was flushed on our approach from the vicinity of a Meadow Pipit's nest containing three eggs. It then flew right away. At about 18.15 it returned, and alighted on the bramble near the nest for about one minute; it then settled in the grass at 18.19 and spent about eight minutes hopping about apparently looking for the nest. At about 18.27 it flapped and apparently pounced on the nest; at the same time the Meadow Pipit appeared from above and mobbed it for a few seconds before alighting in the grass about six feet away. At about 18.31 the Cuckoo reappeared with an egg between its mandibles and flew to a bramble about 100 yards away. There it almost immediately swallowed the egg, but with some difficulty, and it probably spent about 1½ minutes over the operation whilst on the bush. It then flew away and settled on a bramble bush about a quarter of a mile away. An immediate examination of the Pipit's nest showed there were only two of its eggs and one Cuckoo's.'

(2) 'Near Stoney Cross, New Forest, Hampshire, 5th June 1955. With my wife. Cuckoo seen flying in an odd manner, looking very much like a soaring Sparrowhawk, and not at all like a Cuckoo. A very few wing beats then long periods of glides; shape of head was the only characteristic Cuckoo thing about it. Very like the bird at Portland a few years ago.'

(3) 'Millersford Bottom, New Forest, Hampshire, 14th June, 1960. At 17.30 GMT in bright sunshine, light SW wind, what at first was taken to be a female Sparrowhawk was seen quartering low over the heath, about 100 yards away slightly uphill, and mostly over a slight hollow in dead ground. This bird was so extraordinarily like a Sparrowhawk, that if it had not been for the pale underwing streak, and the fact that I had seen Cuckoos doing this before, I should not have given it a second thought. Not only the shape of the bird (rounded wings, spread primaries, and long tail), but also the flight

action (gliding, slower powerful wing beats and, particularly when disturbed from a resting position, the series of four or five rapid full strokes characteristic of Sparrowhawk) was so unlike a Cuckoo; one point I have noticed previously in this type of flight was the extended bastard wing. Both at rest and on the ground, and when presumably nest searching, it was constantly attacked and followed by a Meadow Pipit and at times by a cock Whinchat *Saxicola rubetra*. When at rest it spent much time with its wings half raised above its body, like a pigeon in defensive posture. No sound was heard at any time. Unfortunately the proceedings were disturbed by the approach of a gamekeeper on a motor-bicycle.'

(4) 'On road to Applecross, Wester Ross, 20th May 1962. A "harrier" gliding over a hillside was judged to be about 200 yards away when first seen from the car. On stopping to examine it through binoculars it turned out to be a Cuckoo which continued to beat leisurely in wide circles in typical harrier fashion for about one minute. It then alighted on a telephone wire (with its wings folded above its body), after which I was unfortunately unable to watch it any longer.'

(5) The following incident is not so well documented, but in retrospect I recall that it was, in fact, probably another example of raptor-flight. 'Fusilier Wood, Blagdon, Northumberland, 5th June 1943. With Hon. M. W. Ridley. On seeing what we took to be a soaring Sparrowhawk fly down to the ground in a young plantation, we approached the area carefully. Two Tree Pipits *Anthus trivialis* and several Whinchats were mobbing it. Loud bubbling calls from a female Cuckoo were then heard, and at the exact spot where the "hawk" had landed we saw the bird. At first it remained on the same spot, bobbing its head up and down, but soon began to walk about calling repeatedly, and continually opening and closing its mouth. After about twenty minutes a calling male Cuckoo arrived on a Scots pine near-by, and the hen flew up to join him calling loudly too. On going to the place from which she flew we found a Tree Pipit's nest with five eggs near to hatching.'

DISCUSSION

Chance referred to a type of gliding flight adopted by Cuckoos just before egg-laying and he used such phrases as: 'her flight to the nest was in the nature of an aeroplane glide to earth. Such occasional flaps of the wing as she might require to reach the nest were slow and laboured, somewhat resembling the lazy flight of Buzzard or Owl' (1922: 102); 'the Cuckoo suddenly glided from her look-out tree with a most unusual and fascinating flight' (1922: 65); 'gliding down in aeroplane fashion to settle beside the nest' (1922: 71); and 'circling and floating 200 feet up' (1922: 91). He referred to other Cuckoos

simply as floating or gliding down to nests. Such brief descriptions hardly give adequate credit to this unusual method of flight.

There does not seem to be any doubt that the 'raptor-flight' is the method of flight used by Cuckoos before egg-laying. However, among the five incidents described above, the nests of only two of the prospective foster-parents were found. One was a Meadow Pipit's in which the Cuckoo subsequently laid and the other was a Tree Pipit's which contained five eggs near to hatching; the latter brood of five nestlings was later ringed and there was thus no disturbance by the Cuckoo in that case.

In all the cases mentioned the behaviour was restricted to a very limited area of ground, probably not much more than fifty yards in diameter, which certainly suggests that the bird is in the final stages of finding the nest.

What is the purpose of this method of flight? Superficially Cuckoos resemble Sparrowhawks in having the greyish-blue upper-parts and the barred under-parts of the adults, yellow legs and eyes, and even in the case of young birds the white nape-patch of some males. But the Cuckoo's usual rather weak-looking flight, with most of the wing-beat characteristically below the horizontal mid-line of the flying bird, is very unlike a Sparrowhawk's. The most likely explanation for the raptor-flight is that it is merely an adaptation for soaring flight, although it is not clear why the Cuckoo needs to soar at certain times. Possibly it is able to slow itself down in this way, thus facilitating nest-searching from the air. Perhaps, also, it is indulged in more by Cuckoos in open country where there are few elevated perches from which to watch for nesting birds. The close resemblance to the flight of a raptor is presumably quite fortuitous, for it is difficult to see what advantages this could have—unless it serves to keep mobbing small birds sufficiently far away to prevent undue distraction from its primary aim.

SUMMARY

A method of flight adopted by Cuckoos *Cuculus canorus*—apparently an adaptation to soaring flight used as an aid to the final pin-pointing of the nest of a potential fosterer—is remarkably like that of certain birds of prey, particularly Sparrowhawks *Accipiter nisus*. The term 'raptor-flight' is coined to describe it. Several incidents are detailed.

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Observations on breeding Sandwich and Common Terns

By J. H. Taverner

INTRODUCTION

ACCORDING TO CULLEN (1960), the various tern species breeding in Britain adopt different methods of protecting their territories from predators. The Sandwich Tern *Sterna sandvicensis*, which is not much inclined to attack intruders to the colony, often nests amongst more pugnacious species and relies on their mobbing for the protection of its own territory; furthermore, this species is very ready to desert a breeding site and move to a new area if disturbed in any way. On the other hand, the Common Tern *S. hirundo* depends on its own aggression to drive off predators and so has less need to nest amongst stronger species for protection.

While these differences may apply in many colonies, this paper is intended to show that they are not universal. It is based on observations which I made during weekly visits to a colony on the south coast of England, mainly in 1961, 1962 and 1963.

DESCRIPTION OF COLONY

The colony concerned is at Needs Oar Point, Hampshire. Here both Sandwich and Common Terns nest with much larger numbers of Black-headed Gulls *Larus ridibundus* on a low, mud island that lies across the mouth of the Beaulieu River. At normal high tide this island is a little over half a mile long and about a hundred yards across at the widest point (but at the highest spring tides most of it is submerged). It is crossed by a series of gullies which are flooded at high tide and become empty trenches of soft mud on the ebb. There is a bare, broken line of shingle along one shore, but otherwise the whole island is covered with rice-grass *Spartina townsendii* except on the tops of the gully sides which are lined with sea purslane *Atriplex portulacoides*.

Table 1 shows the *effective* breeding population of each of the three

species concerned during 1961-63. The numbers of Black-headed Gulls that *attempted* to breed were well above this effective population in both 1961 and 1962, but their eggs were systematically collected for hotel restaurants until the second week of May, by which time many pairs had stopped laying. In 1963 there was no such collecting and so the effective breeding population of gulls was much nearer the real figure. I will show later that the increase in Sandwich Terns (and possibly Common Terns) was probably due to this freedom from interference.

Table 1. The effective breeding population (the number of pairs allowed to incubate eggs) of gulls and terns at Needs Oar Point, Hampshire, during 1961-63

	1961	1962	1963
Black-headed Gull *Larus ridibundus*	1,000+	1,000+	3,261-3,611
Sandwich Tern *Sterna sandvicensis*	2-3	3	45
Common Tern *Sterna hirundo*	40-50	50+	82

The Black-headed Gulls nest over most of the island, avoiding only the shingle and the hollows that become awash at normal high tides. Some patches are particularly favoured and at such places the density of nests is very high.

The Common Terns nest only along the gully sides, nearly all amongst the sea purslane. Consequently they are scattered all over the island and do not form a compact colony, although it often happens that several nests are close to one another. Their nearest neighbours are usually Black-headed Gulls and, indeed, the Common Terns have no hesitation in selecting sites where the density of gulls' nests is highest. I have never found a Common Tern nesting on the shingle part of the island, although other species of shore birds do so and other Common Terns nest on identical shingle a little further west along the Hampshire coast. This avoidance of shingle is not due to a lack of nesting sites.

The Sandwich Terns were in two colonies in 1963, one of three pairs on the edge of a small shingle patch and the other a very compact group of forty-two nests amongst *Spartina* in the centre of the island. Both of these colonies were situated where the gull density was rather low.

REACTION TO HUMAN INTRUDERS

A man entering the colony during the breeding season is under constant attack from up to eight thousand Black-headed Gulls in a very concentrated area. Only those whose nests are in the immediate vicinity of the intruder seem to mob, but as the nests are packed close

together, sometimes touching one another, there is always a thick umbrella of attacking gulls overhead. However, I have never seen any of the Common Terns descend into this melee to mob an intruder. Instead, they fly to and fro high above the gulls so that the two species form distinct layers in the air. When I have been crossing to the island, Common Terns have clamoured overhead and have made rather high, attacking dives, but they have withdrawn directly the gulls have started to mob and it seems that they rely on the aggression of the gulls for the protection of their own nests. It could be that the terns do not come down to mob because they are nervous of flying into the ruck of gulls below them, but this does not appear feasible since they go about their daily routine flying through similar numbers of gulls without showing the slightest concern. Indeed, nearly all the aggression that I have seen between the two species in the colony has been initiated by the terns.

In 1963 the absence of egg-collecting enabled the gulls to finish nesting earlier than usual, but the Common Terns had been forced to lay again as their first clutches were washed out by high tides around the time of hatching. Consequently, the Common Terns had the island to themselves in July and, without the protection of the gulls, they did then attack human intruders. However, since their nests were so widely spaced, any one pair was usually attacking without support from its neighbours and, possibly because of this, they never came near to striking; indeed, their mobbing was very half-hearted, even when they had young that were almost ready to fly. The low intensity of the mobbing could have been a result of the terns having come to rely so much on the gulls to beat off intruders that they had partly lost the urge to defend their own territories. Because their early clutches are usually taken, the gulls' eggs normally hatch at more or less the same time as those of the Common Terns and the latter then have the protection of the gulls throughout their nesting period.

That the gulls' mobbing is effective is obvious to anyone who has entered the colony. When there are large young on the ground, the intruder may be repeatedly struck, some of the blows being like a firm slap across the back of the head or the side of the face.

The Sandwich Terns in 1963 were in areas where there were fewer gulls' nests and, therefore, less intense mobbing. They would dive at me when I was near their nests, but never to the point of striking. In fact, most of them would pull out of their dives when they were still about ten feet or so above my head. Nevertheless, they did at least attempt to defend their territories whereas the Common Terns did not do so while gulls were present and this seems to be a reversal of the behaviour outlined by Dr. Cullen.

The most intense Sandwich Tern mobbing that I experienced was

perhaps the least explicable. On two separate occasions, fully a month after the last young Sandwich Terns had flown, I was attacked by an adult which repeatedly dived to within a foot or so of my head when I was on a shingle spit some two hundred yards from the island where the ternery had been. I was never mobbed on this shingle during the breeding season and it is possible that the bird was one which had lingered in the area and which recognised me as a previous intruder on the island. I always dressed in the same way when visiting the colony and it has been shown that some wild birds are able to remember people who have frightened them (see, for example, Lorenz 1952). Dr. Cullen (*in litt.*) has had exactly the same experience with a Sandwich Tern.

TERN NUMBERS AFFECTED BY THE COLLECTION OF GULLS' EGGS

The tendency for Sandwich Terns to desert a colony if they are interfered with is supported by evidence from Needs Oar where the species has apparently been kept in check by the disturbance caused by the collection of gulls' eggs. As already stated, the gulls' nests are robbed until the second week of May, at which time the arrival of Continental eggs forces the price down and collecting at Needs Oar ceases to be profitable. Apart from this, casual intruders have taken eggs on a smaller scale long after the commercial collecting has stopped.

Sandwich Terns have bred at Needs Oar every year since they first did so in 1959, but not until 1963 were more than three pairs located. They would appear in some numbers over the area early in each season, but most would move on without breeding. In 1963, however, when commercial collecting did not occur and when wardening reduced the number of casual collectors to a minimum, the number of breeding Sandwich Terns increased considerably. This was the first time that the terns had not been subject to daily disturbance; in previous years the egg-collector was working on the island at the most critical time when the Sandwich Terns would have started laying.*

The increase in Common Tern numbers in 1963 could have been due to the same cause, but, since these birds arrive a little later than the Sandwich Terns, they used to meet only the last days of collecting and so were subject to less disturbance.

BEHAVIOUR OF YOUNG SANDWICH TERNS

Another unusual feature of the Needs Oar colony has been the behaviour of young Sandwich Terns. Reference books all seem to share the view of Witherby *et al.* (1941) that well-grown chicks leave the nesting

*After this paper was written, these conclusions were further borne out in 1964 when the commercial collection of gulls' eggs once more took place and the number of Sandwich Terns dropped right down again to five pairs.

area and gather by the shore where they react to intruders by moving away in front of them 'like a kind of animated carpet'. At Needs Oar in 1963, however, the young stayed in their nesting area until they flew. There was no attempt to move away, although there was nothing to prevent them doing so, and their reaction to the approach of a human intruder was to 'freeze' in the much-whitened nesting area, with which they blended very well, or to bury themselves in the *Spartina* near-by.

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I am very grateful to Dr. J. M. Cullen for reading the original typescript and for his criticisms and comments, as a result of which several modifications were made in the final paper.

SUMMARY

This paper describes the ways in which Common and Sandwich Terns *Sterna hirundo* and *S. sandvicensis* defend their territories against human intruders at Needs Oar Point, Hampshire. Their behaviour there is apparently the exact reverse of the pattern described by Cullen (1960) in that the Common Terns do not mob intruders when Black-headed Gulls *Larus ridibundus* are doing so, whereas the Sandwich Terns make diving attacks whether or not gulls are present. It is believed that the success of the Sandwich Terns, and possibly also of the Common Terns, is directly affected at Needs Oar Point by the collection of gulls' eggs for food because the disturbance this causes takes place when the terns are about to settle down to nesting. The behaviour of the young Sandwich Terns in this colony differs from other published records of their behaviour when disturbed by human beings in that they 'freeze' or hide in the nesting area rather than attempt to move away to the shore.

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Studies of less familiar birds

131. Melodious Warbler

Photographs by M. D. England and A. N. H. Peach

(Plates 1-5)

UNTIL ABOUT 1954 the Melodious Warbler *Hippolais polyglotta* was considered a rare vagrant to the British Isles with only seven fully accepted records (though eggs taken in Sussex and Surrey towards the end of the last century probably belonged to this species). In the ten years 1954-63, however, there were at least 130 records (mainly during

August-October) and the total ringed jumped from two to 95. In fact, it is now an annual autumn wanderer here in small numbers, chiefly on the south coasts of Ireland and England and around the Irish Sea, but this increase is doubtless only another reflection of improved observation and trapping. The species breeds throughout much of France (except the north-east and extreme north-west), Spain, Portugal, Italy and north-west Africa and, though in the last decade it has been found established in south Switzerland (U. Glutz von Blotzheim, *Die Brütvögel der Schweiz*) and the extreme west of Yugoslavia (D. Rucner, *J. Orn.*, 99: 363-366), any real expansion seems to be held in check by the closely related Icterine Warbler *H. icterina* which replaces it to the east.

The inter-relations of these two species where their ranges meet (and even overlap in eastern France) deserve fuller study than has yet been attempted. The Melodious Warbler is less associated with trees and more with such bushes and shrubs as bramble, hawthorn and dogwood; it also occupies a wider range of habitats from bushy hillsides to stream edges. The two nests on plates 1-5 were in a dense hedge shared with Cetti's Warblers *Cettia cetti* (see *Brit. Birds*, 57: plate 57a). In my experience of about 20 nests, all in Iberia, the nest may be as low as 15 inches and is seldom more than four feet above the ground, while the clutch of striking pink eggs spotted with black is often five rather than four (*cf. The Handbook*). The nest on plates 4 and 5a had much white wool in it and G. Guichard (*L'Oiseau*, 25: 40-43) has described several made of strips of shiny paper. I. J. Ferguson-Lees

The juvenile plumage of the Icelandic Black-tailed Godwit and further occurrences of this race in England

By James M. and Jeffery G. Harrison

(Plates 6-7)

Vernon (1963) focused attention on the occurrence of the Icelandic Black-tailed Godwit *Limosa limosa islandica* in Britain and, quoting Williamson and Ruttledge (1958) in support, indicated that this form appeared to favour the western and southern half of the country. This opinion was also upheld by Nørrevang (1959) and by Boyd (1962) who believed that the majority of the Black-tailed Godwits wintering in the British Isles belonged to this race. On the European Continent, single specimens of *islandica* have been identified from

western France (Havre), Belgium (Dunkerque), Holland (Friesland) and Spain (Andalucia), while birds from Norway in both spring and autumn have been assigned to this race by Holgerson and Willgohs (1956). There are no records from Denmark.

Ash (1964) examined a number of Black-tailed Godwits found dead in Hampshire and Dorset in the severe winter of 1962/63. Of 19 specimens, he determined twelve on measurement as *islandica*; of the rest, two were probably *islandica*, two were intermediate and three which had been damaged by predators were unsuitable as comparative material.

In view of these observations, the writers re-examined all the specimens in their collections. It became apparent that the juveniles could be divided into two distinct groups on colour and pattern, one group being assigned to the Icelandic race on measurements. We therefore studied further comparative material, consisting of a pair of breeding *islandica* and a full-grown juvenile from Dr. Finnur Gudmundsson; five nominate birds and one *islandica* from Holland; five nominate birds from north-west Germany in J.G.H.'s collection; and 11 nominate and 16 *islandica* in the British Museum.

Vernon stated that *islandica* could be identified by 'their shorter bills (sex for sex) and by their redder plumage in the breeding season', to which must be added that the plumage on the upper-parts is much fuller and on the under-parts more heavily barred.

We have found that the colour distinction also holds good for the

Table 1. Colour comparisons of Continental Black-tailed Godwits *Limosa l. limosa* and Icelandic Black-tailed Godwits *Limosa l. islandica*

The colours given are those in Maerz and Paul (1950), the figures in brackets showing the number of the plate concerned and the number of the colour on that plate

	LIMOSA	ISLANDICA
Adult ♂		
Hindneck	Rose beige (5, 10A)	Ferruginous (5, 12D)
Foreneck	Rose beige (5, 10A)	Burnt sienna (5, 12F)
Breast	Rose beige (5, 10A)	Feuille morte (5, 12A)
Adult ♀		
Hindneck	Rose beige (5, 10A)	Spice (13, 12D)
Foreneck	Rose beige (5, 10A)	Bombay (14, 12H)
Breast	Rose beige (5, 10A)	Feuille morte (5, 12A)
Juvenile		
Hindneck	*nearest to* Long Beach+(12, 4A)	Rose beige (5, 10A)
Foreneck	Moonmist (12, 2A)	*nearest to* Longchamps (5, 9A)
Breast	Parchment (12, 3B)	*slightly yellower than* Airedale (14, 6F)

juvenile plumage. In fact the two races have to be matched from two quite different colour ranges in *A Dictionary of Color* (Maerz and Paul 1950). In order to define this, we made colour comparisons of the hindneck, the foreneck and the breast in the two races and the results are given in table 1.

The far richer chestnut colour of the juvenile *islandica* can be seen well even in the black-and-white photographs on plates 6 and 7, particularly in the case of the upper-parts (plate 6). But it is not just a matter of intensity of colour, for the pattern is far more striking not only in the adult *islandica* but also on the upper-parts of the juvenile. There is little doubt that, for anyone familiar with both races in the museum, there are sufficient differences in the juvenile to enable it to be recognised under good visual conditions in the field. In this respect there is a close similarity between the Icelandic Black-tailed Godwit and the Iceland Redshank *Tringa totanus robusta*, for the latter also has a fuller and more contrasted summer plumage than the more southerly races (Harrison 1944).

These differences in colour and pattern help to resolve the problem of the intermediate specimen, for it is recognised that there is some overlap in the measurements that separate the two races. Furthermore, in the case of the juvenile, it enables one to establish an accurate identification in specimens where the bill may not as yet be fully grown.

The 18 specimens listed in table 2 are ones in our collections which

Table 2. Specimens of the Icelandic Black-tailed Godwit *Limosa limosa islandica* in the authors' collections identified on bill measurements and plumage characteristics

Date	Locality	Age/sex	Bill (mm.)
9.8.29	Brookland, Kent	Juv. unsexed	74.5
14.5.35	*near* Canterbury, Kent	Ad. ♀	97.5
1.4.38	*near* Deal, Kent	Ad. ♂	81
22.8.39	*near* Deal, Kent	Juv. ♀	85
22.8.39	*near* Deal, Kent	Juv. ♂	70.25
22.8.39	*near* Deal, Kent	Juv. ♀	85
22.8.39	*near* Deal, Kent	Juv. ♂	71.5
27.11.43	Tetney, Lincolnshire	1stW. ♂	83
1.1.45	Ringwood, Hampshire	Unsexed	82
15.5.45	*near* Sandwich, Kent	Ad. ♀	91.5
15.5.45	*near* Sandwich, Kent	Ad. ♀	91.5
28.8.47	Sheppey, Kent	Juv. ♀	80
28.8.47	Sheppey, Kent	Juv. ♀	83
20.9.47	Sheppey, Kent	Juv. ♀	98
20.9.47	Sheppey, Kent	Juv. ♀	97
24.8.48	North Kent	Ad. ♂	74
24.8.48	Sheppey, Kent	Ad. ♀	96.5
1.9.53	Medway Estuary, Kent	Juv. unsexed	74.5

we have identified as *islandica* on both bill and plumage. They include 16 from Kent, one from Lincolnshire and one from Hampshire, the last having come from a wintering flock of 150.

It is noteworthy that we have only five specimens from Britain which can be assigned to the typical race *Limosa limosa limosa*; all are from Kent. It would seem from table 2 that the Icelandic race is a frequent passage migrant in Kent and here again there is a close parallel with the Icelandic Redshank, which Harrison (1953) has shown to visit the county in appreciable numbers (though in winter as well as on passage).

The North Sea would seem to be a dividing line between the two races, both on passage and in winter. The nominate race appears to be rather less frequent in Britain than was formerly thought.

In this respect, one might wonder which race it is which has returned to breed in England. We have been able to examine a colour transparency taken by Dr. C. D. T. Minton of a juvenile which he caught on 20th August 1960, one of seven which had been in that particular locality since the end of July and which Dr. Minton believes were locally bred. There is no doubt that the bird in question is a good example of *islandica* on plumage characters and, although no measurements were taken, the bill looks relatively short.

Although in a scientific sense this is no proof that *islandica* is the breeding race in England, it is nevertheless suggestive. Occasional breeding birds in northern Scotland have been assumed to be Icelandic, but it might seem surprising that this race should also nest in England. It might be thought that habitat requirements would be different for the two races, but we have seen both on their breeding grounds and the long grasses of the glacio-fluvial plains of south-west Iceland are little different from the lush fresh marshes of north-west Continental Europe. In studying the races of the Redshank, Harrison (1944) showed that the British race *britannica* is more closely related to the Icelandic *robusta* than to the typical race on the Continent. In our opinion, therefore, it is quite possible that the Icelandic Black-tailed Godwit is the race which has returned to nest in England and, especially considering its prevalence on migration and in winter, this may not be so surprising after all.

ACKNOWLEDGEMENTS

We are very grateful to J. D. Macdonald of the British Museum (Natural History), Dr. Finnur Gudmundsson of the Natural History Museum, Reykjavik, Iceland, and Dr. G. F. Mees of the Natural History Museum, Leiden, Holland, for the loan of specimens and to C. W. Mackworth-Praed for the gift of the Icelandic Black-tailed Godwit from Hampshire. We are also indebted to Professor K. H. Voous for his assistance, to Dr. C. D. T. Minton for the loan of the

colour slide and details of the probable English-bred juvenile and to Dr. Pamela Harrison for the photographs of the specimens on plates 6 and 7.

SUMMARY

Juveniles of the Icelandic Black-tailed Godwit *Limosa limosa islandica* are shown to be recognisable not only on measurement, but also on colour and pattern. A further 16 specimens are listed from Kent and one each from Lincolnshire and Hampshire. It is suggested that the nominate race *L. l. limosa* is less frequent in Britain than was formerly supposed and the possibility is discussed that the population which now breeds in England belongs to the Icelandic race.

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Notes

Methods of distinguishing first-year and adult Shelducks in the field.—The separation of first-year and adult Shelducks *Tadorna tadorna* in the field has long been very conjectural and there is still a tendency to describe almost any spring or summer flock as non-breeding, regardless of the gregarious tendencies of breeding adults. My recent study of the Shelduck in Kent (*Ibis*, 106: 333-360) has shown that first-year birds eight to eleven months old form the bulk of the non-breeding population in summer and that most Shelducks reach breeding condition in their second year when they are twenty to twenty-three months old. It is therefore important to be able to identify first-year birds.

Past field work has based the distinction of first-year Shelducks on differences in body plumage and soft parts, namely the incomplete pectoral band and belly stripe and the later development of the knob at the base of the male's upper mandible. While these differences are

valid early in the breeding season, they involve good viewing conditions and a close approach. Even then it is often impossible to determine the plumage differences in swimming birds and, more serious, many first-year males develop pronounced bill knobs during the summer and at the same time their body plumage becomes indistinguishable from that of adults.

Because of these difficulties I examined other methods of separating first-year birds. Eventually I found that a difference in the colour of the greater wing-coverts provides a completely reliable and easily visible field-character. Plate 8, which illustrates the wings of birds found shot, shows that the greater coverts of the adult are white while those of the immature have broad grey edges; the latter can be seen at long range in flight and are often also visible in the closed wing at rest. This distinction is equally useful in analysing flocks in winter when there is no difference in the bill shape of the males and when weather conditions often preclude a close view of the body plumage. In first-winter plumage the median and lesser coverts also have some grey edges and the former cause the grey wing-bar on the greater coverts to appear even wider. Plate 8b also shows the white tips of the secondaries and innermost primaries which are characteristic of first-year plumage. These white tips have been suggested as a field character but I have found them useful only for birds in the hand; in flight they are lost against the light sky.

These differences have been confirmed in the course of field observation of many hundreds of Shelduck, as well as in some thirty individuals reared from eggs, in three first-year birds and two adults collected under a Nature Conservancy licence, in 32 adult females caught on their nests and in 23 birds found dead during the winter of 1962/63. The colour of the first-year coverts is also accurately described in the detailed plumage description in *The Handbook*, but it has apparently remained unused in field work. JOHN HORI

Evident breeding of Black-tailed Godwits in Somerset.—Black-tailed Godwits *Limosa limosa* were first seen at an area of shallow flood water near Muchelney, Somerset, on 31st March 1963 and by 7th April there were 32, many of them in full summer plumage. Such numbers are exceptional in the locality at that time of year. Unfortunately the area was not visited again until 27th June. Then, however, D.E.P. found a pair of Black-tailed Godwits which were clearly holding and defending a territory. On this and later occasions it was noted that they levelled persistent attacks at any birds which passed over or near the area; these included Carrion Crows *Corvus corone*, a Peregrine *Falco peregrinus*, Great Black-backed Gulls *Larus marinus* and Herring Gulls

L. argentatus. Human and other mammal intruders were similarly dealt with.

On 29th June we visited the area together, accompanied by L. M. Fraser, and formed the opinion that the pair was nesting in a water-logged field of lush grass and rushes some 40 acres in extent. Whenever we approached this field one of the pair would rise and fly in circles 10 to 15 feet overhead, beating its wings very quickly and calling incessantly rather like a Lapwing *Vanellus vanellus*. Shortly afterwards it would be joined by the second. Owing to flooded watercourses around the field, we could not get into it to carry out a thorough search. When we withdrew to a concealed position the birds returned to the field, but the rank vegetation prevented us from seeing them on the ground.

On 30th June G.H.E.Y. found them in an adjacent field where the grass was shorter. They were still furiously agitated and aggressive, but this time were landing 20 to 25 feet away and 'injury feigning'. On the ground, too, they were opening and shutting their bills with head and neck thrust backwards. G.H.E.Y. was able to stalk and photograph them at a range of only twelve feet. During succeeding days the pair moved slightly further from the original field and we thought it probable that this was due to the increasing strength of the chicks which were evidently present although, in spite of intensive searches, we could not locate them. The birds were last seen on 18th July. DAVID E. PAULL and G. H. E. YOUNG

[Although the chicks were not seen, there can be little doubt from the behaviour of the adults that this pair of Black-tailed Godwits was breeding. This species has now nested or attempted to nest in at least six areas of Britain since the war and at one of these breeding is an annual event (*Brit. Birds*, 51: 524-525). It is becoming evident, in fact, that Black-tailed Godwits would nest here more frequently if the right conditions were present. We have delayed publication of this record until it was certain that there would not be another attempt at breeding in the area. In fact, Mr. Paull tells us that a pumping station began operating there in the winter of 1963/64, as part of an extensive flood prevention scheme, and the more efficient drainage which resulted made the whole habitat much drier in 1964, so much so indeed that large sections were turned over to cereal crops and such previously common breeding waders as Lapwings, Redshanks *Tringa totanus*, Curlews *Numenius arquata* and Snipe *Gallinago gallinago* were much reduced.—EDS.]

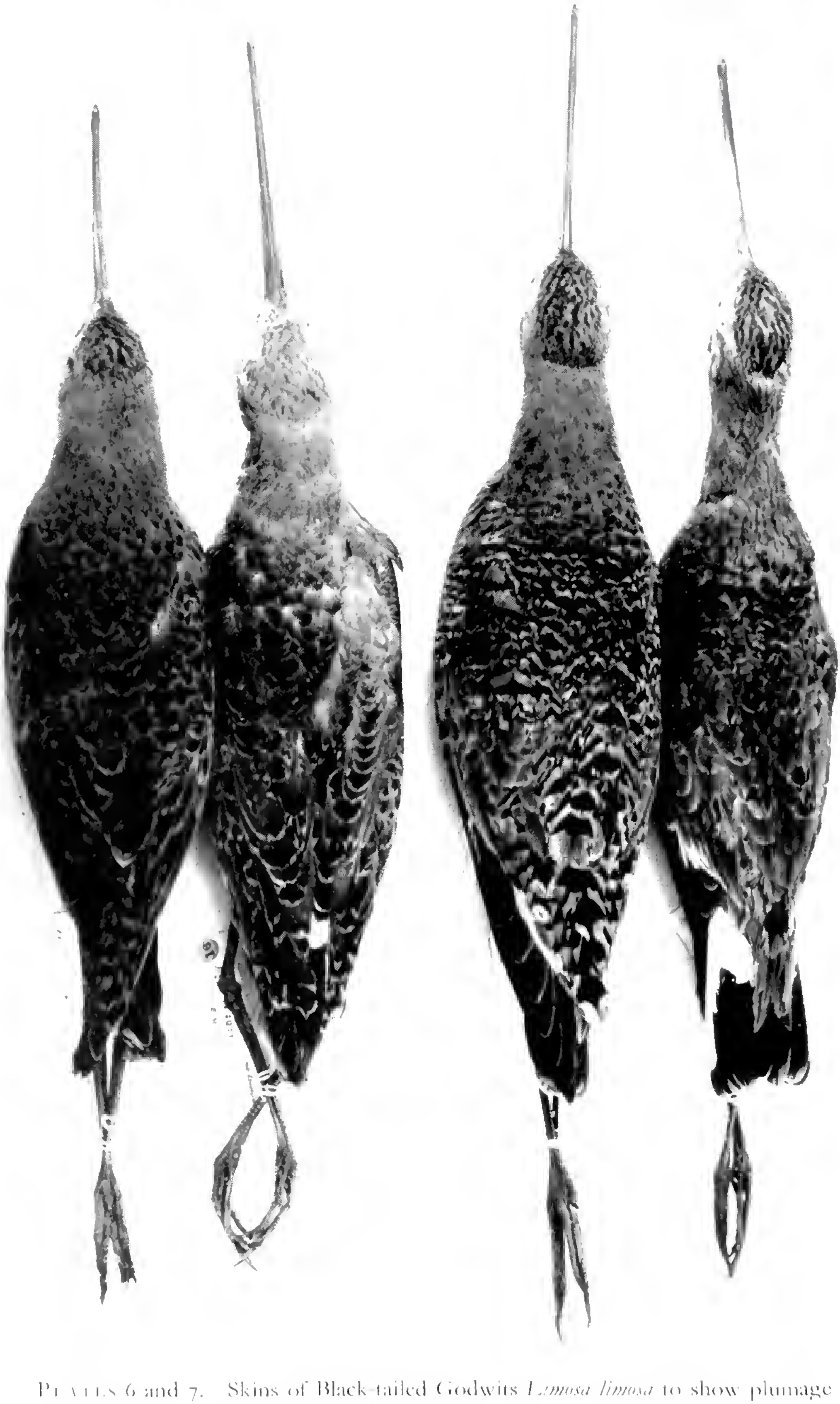
Least Sandpiper in Co. Londonderry.—On 24th August 1963, at Toome sand-pits on the north-western corner of Lough Neagh, Co.

PLATE 1. Melodious Warbler *H[illegible]* at nest, Portugal, June [illegible]. The nest is quite a firm structure of grass and other vegetable matter lined with roots, hair and odd feathers. This one, in which five eggs hatched, was 3[illegible] inches above the ground at the edge of dense brambles (pages [illegible]) (*photo: M. D. England*)

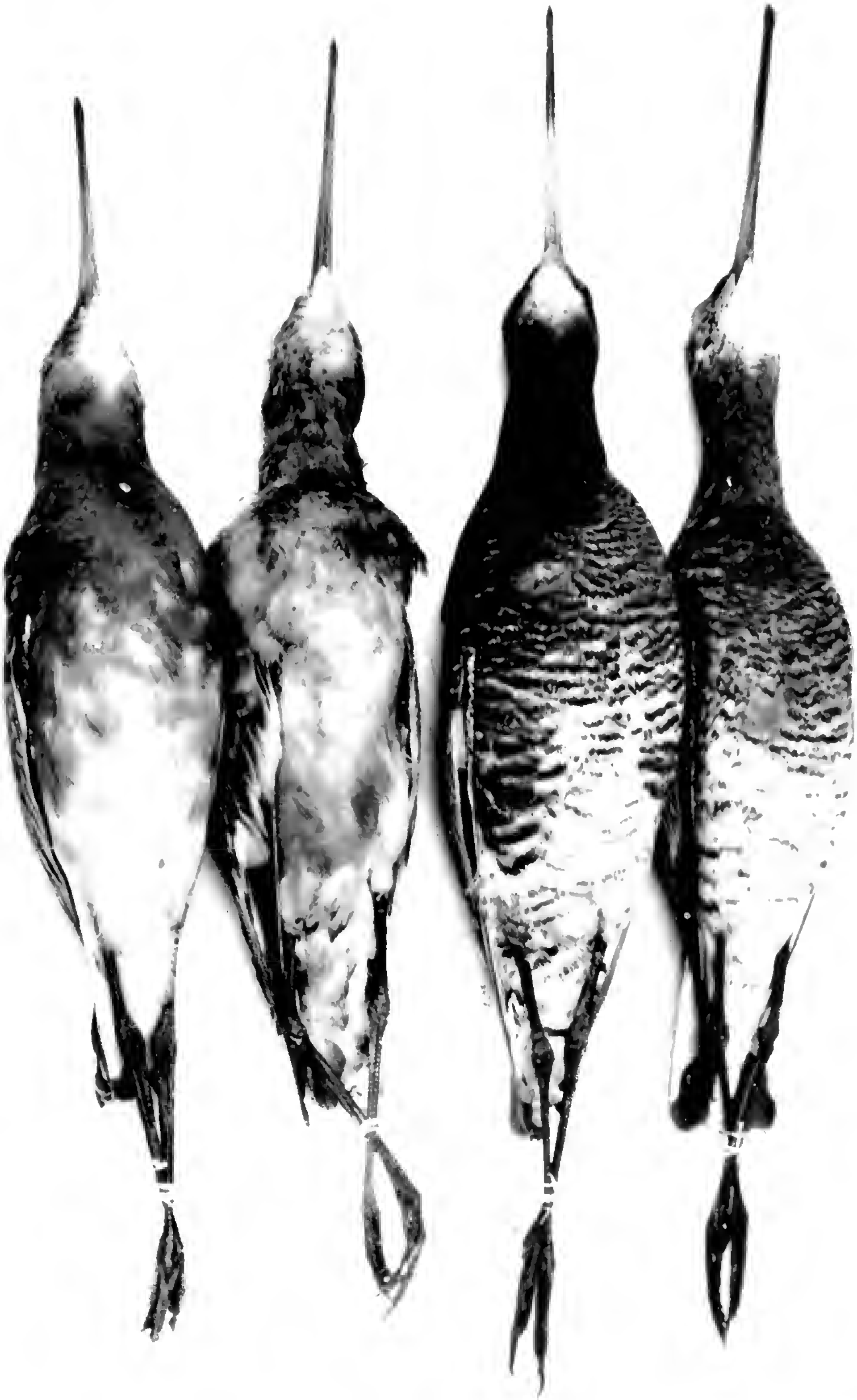
PLATES 2 and 3. Melodious Warblers *Hippolais polyglotta* at nest, Portugal, June 1964. Note the wing-shape, especially the projection of the primaries beyond the secondaries and the wing-tips falling at the base of the tail, since these are useful distinctions from Icterine Warblers *H. icterina* (*Brit. Birds*, 57: 282-3, 1964). The head is also typically more rounded (upper left), but may be flattened like an Icterine's when alert (lower left) (*photos: M. D. England, F.R.P.S., and E. N. H. Peace*)

PLATE 4. Melodious Warbler *Hippolais polyglotta* with larger young, Portugal, June 1964. This bird has a pale patch in the wing, illustrating the limited value of this feature for identifying Icterine Warblers *H. icterina*. This nest, likewise at the edge of brambles, contained much white wool (page 10) (*photo: M. D. England*)

PLATE 5. — Above, looking down on the same nest as in plate 4 while the adult is brooding: this shows the rounded head and characteristic broad base to the bill. Below, another view of the first nest (plates 1-3) with the bird standing upon the edge in an alert posture with its crown again more flattened (Photos: E. N. H. P.).



PLATES 6 and 7. Skins of Black-tailed Godwits *Limosa limosa* to show plumage distinctions of Icelandic and Continental races. Left to right in each case: (1) juvenile ♀ *islandica*, Iceland, August 1958; (2) juvenile ♀ *limosa*, Belgium, August



1916; (3) adult [illegible] *islandica*, Iceland, May 1957; (4) adult ♂ *limosa*, Germany, April 1950. The richer plumage of *islandica*, in particular on the juvenile upper-parts, can be seen even in black-and-white photos (pages 10-14) (*photos: Pamela Harrison*)

Plate 8. Wings of Shelducks *Tadorna tadorna* to show differences in colour of adult and immature wing-coverts. Above, adult male with pure white coverts. Below, immature with grey on greater and median coverts (ignore mud stains on forewing) and white tips to secondaries and innermost primaries (pages 14-15) (*photos: John Hori*)

Londonderry, G.D'A., J.D. and R.A.M. discovered a small, brown-plumaged wader which they subsequently identified as a Least Sandpiper *Calidris minutilla*. They viewed it closely for two hours until the light began to fail, and the next day, 25th August, they were joined by P.S.W. and watched it in exactly the same spot for 3½ hours, in bright sunlight for most of the time.

Its most outstanding characteristic was its absurd tameness and it was this which first attracted attention while it was standing motionless on the shore. For about 90% of the time it was within six feet of us, and on several occasions within three feet, once almost walking between P.S.W.'s legs. At first glance it seemed similar to a Little Stint *Calidris minuta* in summer plumage, but it was actually darker and had a rich pattern of stripes on its mantle and back rather like a typical autumn Little Stint. Its bill was extremely slender and had a distinct, although very slight, downward droop at the tip. The latter feature was particularly noticeable at close range, but even at moderate distances the bill never had the dagger-straight appearance of a Little Stint's. The other salient points were its spindly dark green and flexed legs, a grey tinge on its nape, its square head and its long wings projecting beyond its tail at rest. During the 5½ hours that it was under observation a very detailed description was built up, from which the following are the most important points:

Upper-parts: crown mid to dark brown, lightly flecked with buff; forehead pale; nape and hind neck dull grey, finely streaked dark; ear-coverts varying from off-white to buff, overlaid with fine dark streaks; thin dark line from base of bill to eye; off-white superciliary most conspicuous behind eye; mantle of very dark feathers narrowly edged whitish-buff, these forming two series of stripes which almost converged and then faded away on the lower mantle and back; remainder of mantle and back dark, feathers becoming more broadly bordered with brown on back; scapulars very dark, bordered creamy-buff; wing-coverts mostly dark brown or blackish, edged with buff and golden-brown; secondaries dark brown, outer ones bordered narrowly with whitish-buff and inner ones with copper; primaries dull brownish-black, narrowly edged faint buff; centre of rump and upper tail-coverts blackish, sides pure white; tail dark in centre with off-white or dirty creamish sides. *Under-parts:* sides of neck much as ear-coverts, extending round breast in a narrow gorget of grey-buff, tinged more golden on sides of breast and fairly well streaked dark, although fainter on extreme front of breast; extreme sides of breast near carpal joint of folded wing white; remainder of under-parts white, mottled dark on under-wing. *Soft parts:* legs and feet dark green; bill blackish.

In flight it showed a thin but very distinct white wing-bar and a narrow dark centre to the rump, upper tail-coverts and tail; the pale outer tail and the grey on the nape were noticeable at moderately close ranges and the toes reached to at least end of the tail. It called on rising, a thin *preep . . . preep* or occasionally just a high *peep*, not very

loud but with surprising carrying power and very different to the clipped voice of a Little Stint. On being flushed it did not fly far, but had a fast, zig-zag flight and looked narrow-winged. The habitat was sandy shore with scattered marshy pools, but the bird seemed tired and content to remain on soft sand near the edge of the water. It slept when undisturbed, but tended to spend short periods engaged in very active feeding. On 24th August it was alone, but on the 25th it was accompanied by a Sanderling *Crocethia alba*. There was no sign of it on the 26th.

This is the first record of the Least Sandpiper in Ireland. There have been six in Britain, but only two this century, the last in the Isles of Scilly in October 1962 (*Brit. Birds,* 57: 124-125).

G. D'Arcy, J. Donaldson, R. A. Murphy and P. S. Watson

Sharp-tailed Sandpiper in Co. Durham.—At 5.30 p.m. on 21st August 1963 I located an adult Sharp-tailed Sandpiper *Calidris acuminata* on a pool at Cowpen Marsh, Teesmouth, Co. Durham, and watched it for some two hours as it fed in company with a party of about 30 Ruffs and Reeves *Philomachus pugnax*. The bird was still in breeding plumage, its most prominent field-characters being a bright rufous crown and creamy-buff under-parts spotted with dark brown.

It stayed until 24th August and was seen by over twenty observers including E. Crabtree, E. C. Gatenby, F. G. Grey, R. J. Lightfoot, R. T. McAndrew, J. S. C. Monro, J. D. Parrack, J. K. Smith and A. J. Vittery. At first it was quite tame and allowed an approach to within 15 yards, but it grew more wary towards the end of its stay. The following detailed description was taken:

Size: considerably larger than Dunlin *C. alpina*, but smaller than Reeve. *Shape:* similar to Pectoral Sandpiper *C. melanotos*, but slightly bigger and if anything more portly; long wings and tail formed pointed rear end; when alarmed, stretched neck upwards like Pectoral Sandpiper. *Head:* crown very prominent, rufous-brown, streaked dark brown; nape brown, finely streaked dark brown; pale buff superciliary very prominent behind eye and curving downwards over ear-coverts; lores and ear-coverts darker than chin and sides of head. *Upper-parts:* mantle dark brown with pale buff edges to feathers and well-defined light 'V' on back; primaries and secondaries appeared paler than wing-coverts, edges of greater coverts being tipped with white and forming very narrow wing-bar like Ruff's; rump dark brown in centre with white oval patch at each side, again like Ruff's; tail dark brown and noticeably pointed in centre. *Under-parts:* chin white; upper breast pinkish creamy-buff, sparsely but heavily spotted dark brown; on flanks and sides of breast spots became crescent-shaped and V-shaped; belly off-white; under tail-coverts spotted dark brown. *Soft parts:* bill blackish with proximal half slightly browner, a little longer than head and slightly downcurved at end; legs dark olive-green.

The bird was quite noisy, the usual call being a series of *pleep* or

plee notes sometimes interspersed with *trrrt* or *whip*. On two occasions it gave a five syllable call *plee-plee-plee-trrrt-trrrt* when flushed. This is the first record for Co. Durham and the seventh for Britain.

There is a popular belief amongst British ornithologists that the Sharp-tailed and Pectoral Sandpipers are difficult to separate in the field, but nothing could be further from the truth. The statement with regard to the former in *The Handbook* (rephrased in the *Field Guide*) that 'the markings on the breast do not form a distinct gorget' is, in my view, partly to blame for this. In fact, the Sharp-tailed Sandpiper in breeding dress does not give the impression of having a gorget at all, because the markings on the breast are so widely spaced as to give it an almost thrush-like appearance. In winter these markings disappear, except at the sides, whilst the juvenile's breast is hardly marked at all. In these plumages the Sharp-tailed Sandpiper is much more likely to be confused with a small Reeve, as the creamy-buff under-parts are almost identical. The bird is altogether handsomer and more colourful than the rather dingy, though neatly marked Pectoral.

A juvenile Sharp-tailed Sandpiper which I saw on the mud-flats near the Oakland Bay Bridge, California, on 15th October 1959 had rather more rufous edging to the mantle feathers than the Teesmouth one and, whilst the crown was still the most prominent feature, the whole plumage had a foxier-red cast to it. This bird, like the Teesmouth one, had a single 'V' on the mantle as also had two juveniles seen by Alan Baldridge at Willapa Bay, Washington, on 29th September 1963. The Pectoral Sandpiper usually has two V-shaped markings on the back, although this cannot be taken as an invariable rule.

I maintain that any observer familiar with the Pectoral Sandpiper and faced with a Sharp-tailed Sandpiper for the first time would immediately realise that he had found something 'different'.

PHILIP J. STEAD

Stone Curlew with dark brown plumage.—Stone Curlews *Burhinus oedicnemus* nest (or attempt to nest) annually on an old airfield runway a few miles from Wells-on-Sea, Norfolk. Several visits in 1964 showed that at least four to six were present. On 19th July, as we motored on to the runway, a dark brown bird rose close in front of our slowly moving car, circled round and settled again about 70 yards away. We were able to examine it for several minutes through binoculars before it flew off again. It was a Stone Curlew, but its whole plumage appeared to be uniformly dark chocolate-brown without any visible markings and this colour contrasted vividly with the yellow of its legs. No white could be seen on its wings in flight, but this may have been

because it was then silhouetted against the sky. This individual was not seen on any other occasion. W. W. A. and L. PHILLIPS

[Bryan L. Sage, who has long collected records of birds with abnormal plumage and who has recently summarised these in two papers on albinism and melanism (*Brit. Birds,* 55: 201-225; and 56: 409-416), comments as follows: 'This is certainly the first record of melanism in this species of which I am aware, and my records are pretty exhaustive. It is a very interesting case which I think must be regarded as genetic melanism and not industrial contamination or anything of that kind.'—EDS.]

Detailed description of a first-winter Sabine's Gull.—On 19th October 1963 A. C. Wilkins located a first-winter Sabine's Gull *Xema sabini* feeding by the water's edge at Dungeness, Kent, near a concentration of shore-fishermen. It was extremely tame and during the course of the day was watched by several other observers, including H. A. R. Cawkell, P. J. Grant, L. P. Tucker, P. J. Wilson and myself. Towards mid-afternoon a section of the party, armed with a single-shelf mist-net, were successful in trapping it as it came in to feed on the fishermen's bait. Following its capture, I made a thorough examination in the observatory's laboratory, during the course of which I discovered that there is no detailed description of the first-winter plumage of this species in *The Handbook*. It therefore seems desirable to record the full details of this individual (rearranged, for convenience, in *The Handbook*'s style):

FIRST WINTER.—(*Head* and *neck*) fore-head white; lores grey; crown and nape ashy-brown, feathers tipped paler; feathers round eye black anteriorly, white posteriorly; (*upper-parts*) mantle, scapulars and back ashy-brown, feathers tipped whitish but darker subterminally; rump and upper tail-coverts white, square-cut; *under-parts* white; *tail* white, feathers broadly tipped black; *primaries:* 2nd to 7th black, 4th to 7th tipped white; 8th with outer web black, inner web greyish-white as basal half of 9th; remaining primaries and *secondaries* pure white, inner 4 or 5 secondaries becoming greyer; *median* and *lesser coverts* as mantle; *greater coverts* grey tipped white.

MEASUREMENTS AND STRUCTURE.—Wing 250 mm., bill (from skull) 31, bill (from feathers) 20, tarsus 27, tail: outer feather 105, central 82, depth of fork 23. Primaries: 1st 14 mm. shorter than primary coverts, 2nd and 3rd equal and longest, 4th 12.5 shorter, 5th 36.5 shorter, 6th 54 shorter, 7th 72 shorter, 8th 90 shorter. Weight (at 17.00 hours GMT) 169.5 gm.

SOFT PARTS.—Bill black, base of lower mandible pink; legs, feet and webs pinkish-grey; claws black; iris black.

The bird was released shortly before dusk on the shore and it was here that it spent most of the next five days, although on two or three occasions it was seen in flight up to three-quarters of a mile inland. It was last noted, on the shore, during the afternoon of 24th October.

Although there is nothing particularly remarkable about this occurrence, since a number of Sabine's Gulls are now recorded in the British Isles each year, few observers in this country can have had such an opportunity for sustained observation of this species at all ranges and so some additional notes on its appearance in the field may be of value. It remained very tame and was a small, tern-like gull with a very buoyant flight and an unmistakable wing-pattern of black outer primaries with a white triangle behind them. When resting on the sea it held its wings and tail high and in some ways resembled a phalarope *Phalaropus sp.*, although its head had a rather dove-like appearance. On land its legs were remarkably short. Its tail was clearly forked, although this became less noticeable when broadly fanned. It had a pale forehead and its crown, nape and mantle were a distinctive greyish-brown, rather the colour of a Common Sandpiper *Tringa hypoleucos*; the mantle feathers had prominent greyish-white edgings. Its striking pure white under-parts shaded into a palish grey on the face and upper breast. Its bill and eyes appeared dark and its legs a pinkish-orange.

R. E. Scott

Swallow taking bread.—On 20th August 1964, at Newcastle-under-Lyme, Staffordshire, I watched an adult Swallow *Hirundo rustica* collect and fly off with small pieces of white bread on at least three occasions between 11 a.m. and mid-afternoon. The bread had been widely scattered on a lawn and each time the Swallow landed for a few seconds to pick up one of the bits. It did so both when House Sparrows *Passer domesticus* were feeding there and when no other bird was present. Juvenile Swallows were massing on a house near-by and it seemed likely that the bread was taken to feed young.

A. Paul Bell

Swallows building nest inside Blackbird's.—On 12th September 1964, near Worksop, Nottinghamshire, I found that a nest which a pair of Blackbirds *Turdus merula* had used earlier in the year now contained a brood of five nearly fledged young Swallows *Hirundo rustica*. The nest was in ivy on a wall about three feet above a river; the adult Swallows had built their usual mud cup inside it and lined this with grass, feathers and cow hair.

Trevor Marshall

Migrating Swallows and Meadow Pipits drowning in sea.—Between noon and 2 p.m. on 8th April 1964 I was watching sea-bird passage at Morte Point, on the north coast of Devon, when a group of eight Swallows *Hirundo rustica* passed directly over me heading north. On reaching the sea they appeared to lose height and I saw two of them, which were flying lower than the others, plunge in and appar-

ently drown. A few minutes later a flock of seventeen Meadow Pipits *Anthus pratensis* also headed out to sea in the same direction and four of them likewise hit the water and disappeared.

A fairly strong NNW wind, estimated at force 4-5, was blowing at the time and the sea was choppy, but I was standing at the water's edge only 25-35 yards from where the two lots of birds went in and, so far as I could tell, there was no question of their being hit by waves. Nor do I think that air turbulence can have played a part since there are no real cliffs at Morte Point (only broken and weathered rock which does not rise higher than 30 feet and which gradually shelves into the sea at the point where the birds left the land). In each case, as the flock flew low over the surface, a few unfortunate individuals seemed simply to drop too far. M. GREENHALGH

Unusual association between Blue Tit and Great Tit.—On 8th January 1964, in our garden at Worthing, Sussex, I noticed that a Blue Tit *Parus caeruleus* was persistently following a Great Tit *P. major* and that the two rarely strayed more than a yard or so from each other, almost as if they were a pair. Whenever the Great Tit flew off, which was fairly often, the Blue Tit might fly to rejoin it or, more usually, it would call and the other would return. They had five regular perches, varying from telephone wires to *Berberis* bushes. When in some lilac trees they tended simply to peck at the old seed heads, but when the Great Tit flew to a small laburnum the Blue Tit would follow and beg for food, shivering its wings and calling insistently. The Great Tit did not respond except that it seemed to want to remain with the smaller bird. There was no sign of aggression between them.

This behaviour continued throughout January and February, even when a pair of Blue Tits landed in the same tree. By the first week in March, however, the two birds had split up and near the end of that month the Great Tit (which was easily recognisable because it had a ragged tail) had found a mate of its own species. A pair of Blue Tits were building a nest in the garden by this time, but it was impossible to say whether either of them was the bird which I had seen with the Great Tit. On 30th March the Great Tit was actually fighting with a Blue Tit, the two birds even rolling on the ground with feet interlocked for a short while. BRIAN W. PINKER

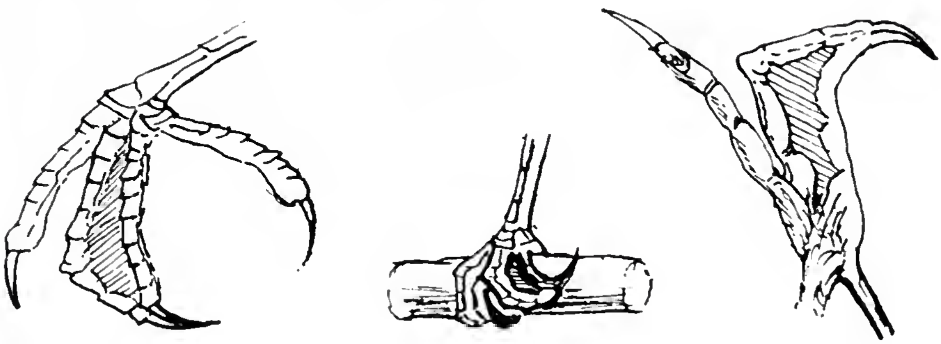
[Derek Goodwin suggests that the Blue Tit may have been reared by Great Tits after both species had laid in the same nest and that it may thus have been imprinted on them. The behaviour described is typical of a female in courtship feeding and there seems no evidence that the Great Tit did more than tolerate it.—EDS.]

Warbling display of Mistle Thrush.—On 21st April 1964, at Warsash, Hampshire, I saw an adult Mistle Thrush *Turdus viscivorus* with its plumage pressed close to its body, especially on head and neck, and with its head lowered and neck extended, uttering an excited warbling and making little runs to and fro along a horizontal bough of an oak. After doing this several times it remained crouching and silent, still with head lowered and neck extended. A minute or so later another Mistle Thrush flew up into the tree from a hedge and attacked it. Both went hammer-and-tongs at each other with their bills, flying up about a foot into the air, each assault lasting two or three seconds, until, after a minute or so, one broke away and flew off closely pursued by the other.

Lt.-Col. W. E. Almond recorded a warbling song by two Mistle Thrushes (*Brit. Birds,* 25: 103), but they were apparently paired and he did not describe any accompanying display. Other published accounts refer only to a warbling sub-song by single individuals.

C. Suffern

Unusual foot deformity of Dunnock.—The accompanying drawings show the left foot of a Dunnock *Prunella modularis* which I trapped at Leeds, Yorkshire, on 6th April 1964. The two outer front toes were connected by a web of skin and were fused at their tips into a single grooved claw. This resulted in a distortion of the middle toe so that it was permanently bent sideways with a right angle in the middle; apart from the web, the outer toe was more or less normal.



Upperside Perched Underside

After releasing the bird I watched it in the field and noted the position of its toes when it was perching. The webbed pair stayed displaced sideways and provided no support, merely resting on the twig. However, the bird did not seem to be discomfited by the deformity and was in good condition.

A. S. Cheke

Reviews

Instructions to Young Ornithologists. V. Birds' Nests and Eggs. By C. J. O. Harrison. Museum Press, London, 1964. 130 pages; 17 photographic illustrations; 8 line-drawings and figures. 15s.

Many modern bird-watchers' knowledge of breeding biology is rather sketchy and Mr. Harrison's book is to be welcomed as an inexpensive introduction to the first part of the subject. The main theme is to show how different modes of nesting may be adapted to environment, and it is rightly emphasised that the breeding habits of each species must have evolved through the interaction of a whole series of influences. However, when considering how variations may have arisen, the reader is often left to think out for himself which of several explanations best fits the facts. A broad perspective is provided by the inclusion of examples from many parts of the world.

The book first deals convincingly with reasons for the egg-laying habit and surveys the great variety of egg-types, and abnormalities, that we know. Various sections adequately cover nest-sites and why nests are necessary, methods of building, the formation of eggs within a bird, the composition of their contents, incubation and embryonic development, the exploitation of eggs for food, and egg-collecting (which is strongly condemned). Egg-shell structure and pigmentation receive very full treatment. Some suggestions are made for further work young amateurs can do, and a few references are given.

One section discusses variations in clutch size and I found this disappointing, a number of points requiring qualification for which there is no room in a review of this length. In general, I feel a better approach would have been made by distinguishing clearly between ultimate factors which result in an inherited tendency to lay clutches of a certain order of size, and proximate factors (e.g. day-length) in response to which many species have the ability, also hereditary, to regulate the precise number of eggs laid. The habit of breeding colonially and the timing of breeding seasons receive no more than passing mention, and there is no direct reference to the use of nest-boxes in research or to experimental studies on egg recognition by sea-birds. However, some of these topics are treated in earlier books of this series.

There are quite a few minor inaccuracies of both fact and grammar. Some are due to over-generalisations, which easily occur in broad surveys of this kind; thus the Gannet is included among birds which 'do not, as a rule, make much of a nest'. In Chapter III the reader is referred to a non-existent (but much needed) diagram showing egg-shell structure. The list of incubation periods of species 'nesting in

Britain' includes Stork, Eagle Owl and Great Bustard. I wish they did!

The book is well produced and the illustrations are very good, even though the egg plates are not in colour. H. MAYER-GROSS

Scottish Wild Life. By David Stephen. Hutchinson, London, 1964. 183 pages; 85 colour photographs. 63s.

The author of this book is probably the best known field naturalist cum professional nature writer and photographer in Scotland today: as a lecturer and broadcaster he has made a special impact, particularly with child audiences. Although many years of observation of the ways of wild creatures have provided him with a wealth of accurate information from which to draw conclusions, his sometimes over-blunt outspokenness in presenting them has not found favour in certain quarters, particularly with game preservationists. Nevertheless, his regular contributions to *The Scotsman* and other newspapers have without doubt contributed greatly in moulding public opinion to a more rational approach to many current problems of conservation. *Scottish Wild Life* is essentially an album of colour photographs—a gathering together of pictures which have appeared previously in *The Scottish Field*. Eighty species of animals are illustrated, each plate being supported by a page of facing text. Birds are the chief subject, but there are photographs also of Badger, Fox, Brown Hare, Hedgehog, Mole, House Mouse, Brown Rat, Red Deer, Roe Deer, Stoat, Weasel and Common Toad. Although most of the photographs are satisfying, and some excellent, there are others which are not up to the standard expected nowadays in a book of this price. The text is pleasantly informal and chatty, but at the same time incorporates many interesting snippets of observation.

A book as general as this, and so random in its selection, would not normally be reviewed in this journal. The 22-page introduction is, however, recommended as a concise summary of man's effects on Scottish wild life over the years, and of what is now being done to redress the position. One mis-statement must be corrected: there is still no record of a Nightingale nesting in Scotland, notwithstanding the singing male at Stirling in 1952. Moreover, if the nesting of Montagu's Harrier in Perthshire in 1953 had required for its authentication 'the photograph in this book', then proof would still be lacking: no harriers are pictured. W. J. EGGELING

Biology of Birds. By W. E. Lanyon. Nelson, Edinburgh and London, 1964. 163 pages; 64 line-drawings, maps and diagrams. 21s.

In this small book the author tries to cover too much ground, with the

result that the text is sometimes readable only to those well-versed in the literature and yet includes such statements as 'It may come as a surprise to some readers to know that birds have ears'. Why else would they sing and call?

The factual content of the book is largely correct, but in this, the British edition, there is one major source of error. Presumably in order to gain a greater appeal to British readers, the names of European species have sometimes been substituted for American ones in the text. This substitution, though credited to Sir Gavin de Beer on the flyleaf and to J. D. Macdonald in the preface, includes serious mistakes. For example, it comes as a surprise to find that the 'Greenfinch defecates through the opening of the nest cavity', that 'The Marsh Warbler has a breeding range that extends over most of southern Canada and the entire United States' and, indeed, that all but one of the species in the family Sylviidae are confined to the New World. Elsewhere the Willow Warbler is stated to be a bird of grassland and normally polygamous.

There are a large number of line drawings. While the maps and diagrams are generally clear, the drawings of birds are sometimes poor. Nor is the choice of species for illustration always good. For example, the author has selected as characteristic of the Neotropics a most atypical toucan and a cotinga which the reviewer failed to recognise.

Most subjects are covered, at least slightly, though there is little on population studies. The book is not a worthy successor to the other recent books on bird biology and it is not the one that I should recommend to the bird-lover who wishes to widen his horizons.

C. M. PERRINS

Learning and Instinct in Animals. By W. H. Thorpe, F.R.S. Methuen, London, 1963. 558 pages; 9 monochrome photographs; 70 text-figures. 63s.

This is the second edition of a book which was originally published in 1956 with the important aim of reviewing the considerable literature in the field of learning and of integrating this with the more naturalistically orientated studies of animal behaviour commonly associated with the names of K. Lorenz, N. Tinbergen and K. von Frisch. The book is divided into three unequal sections. The first two, which occupy about two-fifths of the whole, concern such general problems as the classification of the types of learning used by Dr. Thorpe and theories, still very speculative, about the nervous mechanisms underlying learning. The last and longest section illustrates the different types of learning exhibited by animals, group by group from protozoa to mammals, and here the 107 pages about birds will be the main interest to readers of *British Birds*. This part, like the rest of the book, has

been enlarged as a result of work since the first edition was written. The additions include, for instance, further work on local traditions in behaviour, the learning of skills in pulling up strings to reach food, the organisation of nest building and other reproductive behaviour into an adaptive sequence, the habituation of the mobbing response to a repeated stimulus, and new facts on imprinting, social learning, imitation and the number sense in birds. There is also a review of orientation and homing, which has been brought up to date by C. J. Pennycuick since the first edition.

In selecting facts to be mentioned from the mass of material available about learning, Dr. Thorpe has been guided by their relevance to the natural history and biology of the creatures concerned. This is certainly where the field naturalist has most to contribute to the study of learning, which in many of its aspects is a highly technical laboratory subject with a sophisticated structure of theories linked with it. The learned familiarity of a bird with its territory may be crucial in determining whether or not it survives in an emergency: for instance, Nutcrackers bury nuts in the autumn and remember their location months later when the ground has been covered with snow and other food is not available. Learning is also known to be important for some birds in recognising their enemies, and in acquiring the normal species-characteristic feeding behaviour often supposed to be innate. Relevant here is the development of new food habits, apparently by imitation, such as the well known milk-bottle opening of tits, whose spread in Britain was, and could only have been, documented by a network of amateur observers over the country. While quite a lot is known of the role of learning in some kinds of behaviour (e.g. song) largely through Dr. Thorpe's own work, in other aspects such as habitat choice we are almost totally ignorant of its importance for any species.

This book is not easy to read, especially the first two sections, and a familiarity with the specialised language of psychology and biology is assumed, but if the field naturalist will take the trouble to achieve this he will be able to see his own observations in a broader and richer framework of ideas. J. M. CULLEN

Letters

Redstarts nesting on the ground

Sirs,—J. M. Bayldon, in his note on a Redstart *Phoenicurus phoenicurus* nesting on the ground (*Brit. Birds*, 51: 365), suggests that this is an unusual occurrence. However, L. Siivonen (*Orn. Fenn.*, 12: 89-99) has given reasons for believing that the original habitat of the Redstart

was in dry pine woods and has pointed out that in these places 90% of the nests are on the ground. As I suggested in my monograph on the species (*The Redstart*, 1950, pp. 121-125), it seems likely that the normal nest site is a hole in or on the ground, and that the use of holes in trees was an adaptation to habitats where the ground was damp. Ground nests are much more difficult to find than those in trees, but there are very many such records both in this country and elsewhere.

E. J. M. BUXTON

[Apart from Mr. Buxton's letter published here, the note by J. M. Bayldon prompted a number of other records of ground-nesting Redstarts and it is clear that this habit is much commoner and more widespread in Britain than we or the authors of *The Handbook* had suspected. The individual records concerned, fifteen in all, have been sent in by M. Marquiss, Rev. G. W. H. Moule, Hubert E. Pounds, Dr. D. A. Ratcliffe, J. G. Skidmore, Dr. N. F. Ticehurst and C. A. White. Dr. Ticehurst's observation takes us back as far as 1896 and Mr. Marquiss reports five ground nests in Northumberland, the county concerned in Mr. Bayldon's original record; the others refer to such widely scattered counties as Surrey, Norfolk, Worcester, Westmorland, Cumberland and Inverness. The majority describe sites among dead bracken or ferns, but three were under logs or branches lying on the ground and two were eleven and twelve inches inside holes; most were in areas where 'normal' tree-sites were available in plenty. In addition, Dr. Bruce Campbell has drawn our attention to his book *Finding Nests* (1953, p. 121) where he wrote, ' "Ancestral" ground sites are still used in some districts, e.g. Sheffield . . ., nest being placed under dead bracken or grasses and entered by tunnel', while C. A. White points out that the habit was referred to by W. Yarrell in his *A History of British Birds* (1837-43) and by T. A. Coward in *The Birds of the British Isles* (1920).—EDS.]

Proposal for a Royal Air Force Ornithological Society

Sirs,—Members of the Royal Air Force make a useful and active contribution to ornithology in all areas in which they serve. In such places as Cyprus, Aden, Singapore and Hong Kong, in fact, they have actually founded local organisations (or been responsible for their continued existence).

One of the initial disadvantages which R.A.F. personnel meet in postings overseas is a lack of ornithological contacts and local information. I think this could largely be overcome by the formation of a Royal Air Force Ornithological (or Bird-watching) Society, whose function would be to supply addresses of overseas ornithological organisations with details of their scope and activities, titles of relevant

literature, and a list of members (both serving and ex-service) with their current addresses. The publication of a bulletin giving this and other information, with notes on the field activities of members overseas, would be a possible development. If sufficient support were forthcoming from bird-watchers serving with the Royal Air Force, I am sure that we could make a useful contribution to world ornithology and help members to make their overseas tours even more enjoyable and interesting.

I should be pleased if anyone interested in forming such a society would write to me at the Sergeant's Mess, Royal Air Force, Coltishall, Norwich, Norfolk. (SGT.) F. J. WALKER

News and comment

Edited by Raymond Cordero

Annual Report of the Nature Conservancy.—The sea around Britain and Ireland is now substantially contaminated by organo-chlorine pesticides. This is revealed in the Fifteenth Annual Report of the Nature Conservancy (H.M.S.O., 13s.), which covers the year from October 1963 to September 1964. Analyses of 37 eggs of ten species of marine birds from Scolt Head (Norfolk), the Farne Islands (Northumberland), St. Abb's Head (Berwickshire) and Great Saltee Island (Co. Wexford) revealed detectable residues in every case. Nine eggs contained a total of more than three parts per million of various organo-chlorines and eight contained more than one part per million of dieldrin. The highest figures came from the eggs of birds that eat large fish or molluscs and, although the Report itself does not name them, it has since been revealed that the ten species concerned were the Cormorant and Shag (feeding on large marine fish), the Shelduck and Oystercatcher (marine molluscs), the Kittiwake (large plankton), and the Little Tern, Sandwich Tern, Razorbill, Guillemot and Puffin (small marine fish and marine invertebrates).

Meanwhile, the Nature Conservancy's important researches in this field of organo-chlorine pesticides are continuing. At Monks Wood Experimental Station in Huntingdonshire a stock of Bengalese Finches is being bred for studies of the sub-lethal effects of these chemicals on reproduction and behaviour. Non-breeding stocks of wild-caught House Sparrows are also being used for toxicological experiments.

Turning to other aspects of the Nature Conservancy's work, we applaud the considerable progress made by the Wildfowl Conservation Committee with the designation of National and Regional Wildfowl Refuges during the last two years. Among these Loch Leven, in Kinross, which was declared a National Nature Reserve on 4th March 1964, is of outstanding importance for its breeding, migratory and wintering birds.

At Caerlaverock, Dumfries-shire, one of the main objects of management has been the rebuilding of the depleted wintering population of Barnacle Geese from Spitsbergen. Since the bye-law became operative there six years ago, the total has increased from 1,000 to 3,000. The system of controlled shooting under permit has proved valuable in serving the aims of conservation and at the same time providing an optimum amount of first-class sport. The reconciliation of the protection of the feeding grounds of geese and ducks with the sport of wildfowling is one

example of developments in which the efforts of the Conservancy has won Britain a position of world leadership. 'But,' says the Report, 'there are still some individuals, though yearly their number becomes smaller, who fail to recognise the importance of this work and, indeed, appear to some extent to be prejudiced against it.'

At Southport, Lancashire, the population of wintering geese, mainly Pinkfeet, has remained at about 4,000 in recent years. Elsewhere in Lancashire another new National Wildfowl Refuge, the Wyre-Lune Sanctuary, came into being in November 1963. The original proposal for this refuge in the inter-tidal area between the estuaries of the Rivers Wyre and Lune was made by the Morecambe Bay and Fylde Wildfowlers' Associations. Its main purpose is to protect the roosting areas of wild geese. Pink-footed and Grey Lag Geese are the two most important species in the area, but there are also smaller numbers of White-fronted, Bean and Barnacle Geese.

A new Sussex reserve.—Pagham Harbour, a renowned and largely unspoiled bird-watching area near Chichester in Sussex, has been declared a local nature reserve by the West Sussex County Council. The decision marks the successful conclusion of long negotiations aimed at reconciling the interests of local residents, holiday makers, wildfowlers and naturalists. Wildfowling under the control of the local association will continue. The proposal was first suggested in the West Sussex County Council's development plan, and resuscitated in 1962 by the Sussex Naturalists' Trust who submitted a scientific report prepared on their behalf by B. A. E. Marr.

So far the reserve is limited to land below the high water mark and the beaches on the seaward side of the harbour, but talks are already in hand with a view to enlarging the area to cover the pools and reed beds and other attractive features. The Trust is most anxious to preserve the evocative atmosphere of the whole. Besides being famous for its wintering wildfowl, migrating waders and a fair share of Sussex rarities, Pagham also has a small nesting colony of Little Terns.

Birds and Steelworks.—A growing feature of British post-war industry has been the siting of large steel works, sometimes covering several thousand acres, on or near coastal areas which were often formerly marshes. The most recent such project is Richard Thomas & Baldwin's Spencer Works at Llanwern, Newport, Monmouthshire. This is a 2,800-acre site, much of which is not developed and where original reed-beds, pools and ditches have been retained. In September 1963 P. N. Humphreys and G. I. McCabe began an enterprising twelve-months survey of the area and they have now produced a report on its results.

A total of 72 species of birds in the year included a stranded Manx Shearwater, a variety of ducks (with Mallard nesting), Green and Great Spotted Woodpeckers, breeding House Martins (see *Brit. Birds*, 57: 203-204), all three British wagtails, and House Sparrows nesting on the coke ovens within a few feet of the furnaces. The works have provided a haven in bad weather for such birds as Coots, Moorhens and Pied Wagtails and a favourable nesting site for various other species. Mallard, Teal, Shoveler and Snipe find one part attractive as a safe feeding ground during the winter and the Mallard vies with the House Sparrow and the Moorhen in its adaptation to industrial conditions. The only hazards, apart from disturbance, appear to be patches of oil (which have accounted for Moorhens and young Mallard at times) and an increased risk of predation from Carrion Crows and Brown Rats.

Messrs. Humphreys and McCabe sum up: 'Although it cannot be said with certainty, as no survey was done in the past, it would certainly appear that the area within the site fence now attracts at least as large a number and variety of birds as it did before the works was built . . . industry is not inimicable with nature conservation . . . and some firms now manage to maintain a variety of wild life on the areas under their control; for instance, the Steel Company of Wales maintains the reservoir

at their Margam works as a reserve for wildfowl and it attracts a great number of duck and waders each year. The same might be said of the Spencer works . . . particularly if a certain area was managed correctly with maintenance of water levels and occasional clearances of scrub, sedge, etc. Nest boxes for owls, Kestrels, etc., might attract these birds to the site and help to keep down vermin; rush baskets for duck could also provide nesting sites safe from crows and Magpies. Disposal of waste would need great care taken if this area were not to be rendered entirely derelict, but the establishment of a wildfowl reserve might provide a more exciting and certainly less expensive form of landscaping than the conventional formal gardens now to be seen around most contemporary industrial plants.'

Recent reports

By I. J. Ferguson-Lees

(These are largely unchecked reports, not authenticated records)

This summary is primarily concerned with the more unusual non-passerines from mid-September to the fourth week of November and thus overlaps with that in last October's issue (*Brit. Birds,* 57: 441-444); the passerines of this second half of the autumn were covered in the December number (57: 523-524).

So far as American vagrants were concerned, the autumn ended the way it began (*cf.* 57: 442) as one of the poorest for years. **Pectoral Sandpipers** *Calidris melanotos* in the Isles of Scilly and Kent in late September and in Co. Wexford in the second week of October brought the autumn total to only about ten, compared with approximate figures of 23, 24, 29 and 25 in 1960-63. The **Long-billed Dowitcher** *Limnodromus scolopaceus* at Shotton Pools (Flintshire) (57: 340 and 442) was still present in late October, but the only other was one at Cresswell Ponds (Northumberland) from 27th October to at least 28th December; compare this with the total of twelve dowitchers *Limnodromus spp.* in Britain and Ireland in 1963. A **Wilson's Phalarope** *Phalaropus tricolor* was found at Bettisfield (Shropshire) on 11th October, but this was only the second of the autumn. Two species appeared in what might be regarded as normal numbers on the experience of recent years: **White-rumped Sandpipers** *Calidris fuscicollis* in Co. Kerry on 20th September, on St. Agnes (Isles of Scilly) from 22nd to 29th September, at Devoren Creek (Cornwall) on 19th October and at Wisbech sewage-farm (Lincolnshire/Norfolk border) from 24th October into November; and **Lesser Yellowlegs** *Tringa flavipes* in Co. Wexford in September, at Stanford Reservoir (Leicester/Northampton border) from 17th to 23rd October and in Co. Dublin from 25th October to at least 10th December. The only really unusual American wader was an **Upland Sandpiper** *Bartramia longicauda* at Minsmere (Suffolk) on 24th September (three others in the previous six years). However, an American **Black Duck** *Anas rubripes* was identified at the King George VI Reservoir, Staines (Middlesex) from 8th to 15th November and, if accepted, will be the first for Britain; an adult female was recorded in Co. Kilkenny in February 1954 (48: 341).

In spite of the generally eastern autumn, the wader passage was not marked by any strong Asiatic influence. The numbers of **Little Stints** *Calidris minuta* and **Curlew Sandpipers** *C. testacea* were quite high in eastern counties and there were also some in other districts across to western Ireland, but neither species reached the invasion proportions of certain other recent years. The only **Temminck's Stints** *C. temminckii* were in Co. Kerry on 17th September, at Mansfield Reservoir (Nottinghamshire) on 29th September and on the Ribble Marshes (Lancashire) on 10th October. **Grey Phalaropes** *Phalaropus fulicarius* were unusually scarce: there were

just a few odd ones in the south and west from Kent and Cheshire to the Isles of Scilly and Co. Cork. The only **Red-necked Phalarope** *P. lobatus* reported in the period was one at Snettisham (Norfolk) on 2nd October.

Several **Ferruginous Ducks** *Aythya nyroca* appeared in various counties from Kent to Huntingdon, Derby and Nottingham and there was the usual scattering of **Red-crested Pochards** *Netta rufina*, most of which probably referred to escapes. The occurrence of a female **Garganey** *Anas querquedula* as far north as the Isle of Islay (Argyll) on 10th September is interesting, but unfortunately the bird was shot. The only really rare duck in the period, apart from the American Black Duck already mentioned, was a **King Eider** *Somateria spectabilis* at Lerwick (Shetland) on 19th October.

Among a number of interesting heron-like birds, the most unexpected was perhaps the **Glossy Ibis** *Plegadis falcinellus* which remained on the Axe estuary (Devon) from 22nd November to 19th December; what was possibly the same bird appeared near Wadebridge (Cornwall) on 31st December. A **Squacco Heron** *Ardeola ralloides* stayed at Slapton Ley (Devon) from 19th to 30th September. Among records of **Spoonbills** *Platalea leucorodia* were single ones as far north as Northumberland, Fife, Perth and Nairn. An unusual scattering of **Flamingos** *Phoenicopterus ruber* attracted attention at one time or another during the autumn in almost all east and south coast counties from Northumberland and Co. Durham round to Devon and Cornwall, and even inland in Midlothian, Lincolnshire and Nottinghamshire; in all, ten or twelve seem to have been involved. They included both adults and immatures, but any critically examined proved to be of the South American race *chilensis*. So far we have no clue as to their origin, but these Flamingos are regularly imported into Britain, Belgium and the Netherlands.

An **albatross** *Diomedea sp.* off Old Head of Kinsale (Co. Cork) on 5th October makes it worth mentioning rather belatedly that a **Black-browed Albatross** *D. melanophrys* was identified in Brandon Bay (Co. Kerry) on 15th August just before an unidentified albatross was seen in Cornwall (57: 443). As many as 69 **Leach's Petrels** *Oceanodroma leucorrhoa* appeared off Hilbre Island (Cheshire) on 20th September, but, although odd ones were reported from Cornwall round to Yorkshire in the weeks that followed, there was no suggestion of a wreck apart from one at Wilstone Reservoir (Hertfordshire) on 22nd November; a **Storm Petrel** *Hydrobates pelagicus* was found dead in a garden near Maidstone (Kent) on 17th October. A few **Little Auks** *Plautus alle* arrived off the east coast in November and there were also single ones at Beckingham (Nottinghamshire) and Portland (Dorset) on the 2nd and 3rd respectively, but again no suggestion of a wreck. It was a poor autumn for **shearwaters** *Procellaria spp.* but a good one for **Pomarine Skuas** *Stercorarius pomarinus*, there being a number of records off east, south and west coasts and as many as 20 to 30 off Hunstanton (Norfolk) on 23rd October. The only **Long-tailed Skua** *S. longicaudus*, however, was one on Hilbre Island on 6th October. A few **Sabine's Gulls** *Xema sabini* appeared around Cornwall and the Isles of Scilly between mid-September and late October, but no more than usual. **Mediterranean Black-headed Gulls** *Larus melanocephalus* followed the normal pattern on the south coast from Kent to Cornwall and on the east coast to Essex, Suffolk and Co. Durham, but they also included one in Co. Cork on 4th October.

The occurrence of a **Snowy Owl** *Nyctea scandiaca* in the Isles of Scilly attracted a lot of attention: it was first seen on St. Agnes on 10th October and on other islands for some weeks afterwards; another stayed on Fetlar and Whalsay (Shetland) from mid-June to 14th October. It was not a good autumn for **Hoopoes** *Upupa epops*, but among the more interesting records were single ones on the Isle of Skye (Inverness-shire) and Tory Island (Co. Donegal) in September and at Hauxley (Northumberland) on 8th and 9th October.

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Effects of the cold weather of 1962/63 on the Blackbird population of Dollis Hill, London

By Eric Simms

INTRODUCTION

The purpose of this paper is to record the marked fluctuation in the numbers of Blackbirds *Turdus merula*, as a result of the severe weather of 1962/63, in an area closely studied by the author for fourteen years. The ornithology of this study area of some 546 acres at Dollis Hill in north-west London has already been described by the author at length (Simms 1962). However, the exceptionally cold weather of 1962/63, unlike that of 1955 and 1961/62, had an appreciable and comparatively long-lasting effect on the numbers of Blackbirds breeding in the area. Censuses carried out during 1951-61 of all the breeding species were continued until the present time and so a clear comparison can be made between the figures for different years. Table 1 shows the numbers of Blackbirds breeding in the study area in each year from 1951 to 1964 and compares the densities with some recorded elsewhere.

ANNUAL BEHAVIOUR PATTERN AT DOLLIS HILL

Suburban Blackbirds are very markedly territorial and it is possible to plot their individual territories at Dollis Hill with some accuracy. Since 60% of the study area consists of some 330 acres of land occupied by rather more than 3,600 houses the population is essentially a garden one. Consequently territories tend to have as their nuclei the traditional, often annual, breeding site. This makes for a rather conservative, static pattern with pairs using the same site for many years; a pair of Blackbirds has nested in a *Philadelphus* in my own garden at least once in every year from 1951 to 1964. There are scores of these traditional sites. If the nest-site is destroyed, then the boundaries of each territory immediately adjoining it will vary. Since 84% of all the

Blackbird nests in the area are in trees, bushes or creeper on walls there is always the danger of a safe nesting site being cut down. Although the Blackbird is more adaptable than the Song Thrush *Turdus philomelos* and will also use ledges on fences, pipes on walls, stacked ladders, sheds and so on, these are less important than sites with natural cover.

The power of the territorial urge varies throughout the year. In the winter the old pairs tend to keep to their established territories, while a number of young birds capture small temporary domains—the 'sub-territories' described by Jackson (1954)—but I would agree with Snow (1956) that these newcomers are not on a lesser footing than the older occupants. In late September and October the territorial drive

Table 1. Breeding densities of Blackbirds *Turdus merula* in 546 acres at Dollis Hill, London, during 1951-64, compared with some recorded densities in other habitats

(A) DOLLIS HILL

Year	Males in March	Pairs breeding	Pairs per acre
1951	198	185	0.338
1952	199	188	0.344
1953	198	191	0.349
1954	197	190	0.347
1955	196	186	0.340
1956	199	187	0.342
1957	198	189	0.346
1958	218	212	0.388
1959	194	188	0.344
1960	195	187	0.342
1961	200	194	0.354
1962	199	192	0.351
1963	93	86	0.157
1964	244	200	0.366

(B) OTHER HABITATS

Habitat	Pairs per acre
Overgrown garden, south Wales (Campbell 1953)	2.771
Botanic Garden, Oxford, 1954 (Snow 1958)	2.660
Botanic Garden, Oxford, 1955 (Snow 1958)	2.160
Botanic Garden, Oxford, 1953 (Snow 1958)	1.830
Dublin suburb (Jackson 1954)	0.724
Oxford University Parks, 1954-56 (Snow 1958)	0.485
Oxford University Parks, 1953 (Snow 1958)	0.442
Ladbroke Square Garden, London, 1936 (Simms unpublished)	0.428
Surrey oakwood (upper limit) (Beven 1952)	0.283
Oxfordshire farmland (Chapman 1939)	0.161
Surrey oakwood (lower limit) (Beven 1952)	0.089

is less and I have often counted parties of from three to 36 Blackbirds feeding under oak trees in Gladstone Park or elms near Dollis Hill Lane. Numbers are certainly augmented at this time by immigrants, but the residents will join them on occasion to feed outside their territories. Although Blackbirds will feed unconcernedly close to each other, they never give the appearance of being 'social' birds.

By February and March the established territories are being occupied and there is an appreciable rise in the aggressive behaviour of both old and young. A spell of cold weather such as occurred in February 1955 may inhibit this for a time. On a Middlesex farm during 1954-57 Seel (1961) also found that snow and frozen ground in winter and early spring could be correlated with a reduction in number as well as delaying the formation of the breeding season population. The winter visitors usually leave in March, the old pairs that have survived remain on their territories and some of the young birds succeed either in filling gaps left by death or in squeezing themselves into a new territory between existing ones; this latter event is infrequent because of the rather rigid territorial pattern of the district. Snow (1958) stated that in the Botanic Garden at Oxford more new pairs were formed in late February and early March than at any other time. At Dollis Hill this is also true; the process is only delayed by adverse weather.

Blackbird song may begin occasionally in December, but it usually starts up in mid-February, often from young ones coming to their first territory. Suitable song-posts are often the first attraction for the young and in a suburban area there are many television aerials, chimney stacks and pots, gutters and rooftops to provide these; yet the newcomer may fail if there is no breeding site, since a male must acquire a suitable territory before obtaining a mate. After the territorial balance has been established, the composition of the population may be altered by the death of individuals, the departure of survivors of a pair and the arrival of newcomers. New pairs and new territorial boundaries may therefore be set up, but the shape, number and spread of the territories are very similar from year to year. From spring until July the territories are defended against all other Blackbirds; after this, as the moult arrives, the drive begins to wither. Aggressiveness in the autumn, when the sexual drive is low, may be directed to male and female alike.

During 1951-62 the total number of pairs of Blackbirds breeding at least once each year in the area varied between 185 and 195, except in the year 1958 when the total rose to more than 200 pairs. In 1961 the number of pairs breeding was 194 while in 1962, despite the cold weather earlier in the year, the total fell by only two. Undoubtedly in all these years a high proportion of old birds survived from one breeding season to the next and this would prove a stabilising factor in the

crest in full sexual display to an object on a snowfree concrete path in the garden. He bowed, ran forward, bowed again; this continued for a quarter of an hour until at last he mounted, attempted coition for some ten seconds, dropped down and finally flew off. I went out at once to find that the substitute for the female was, in fact, a particularly black lump of coal some two inches long and one inch wide. Such an inanimate, unavian surrogate was quite outside my experience. Another symptom of the restless nature of the return in March was the series of high-flying reconnaissances that many birds carried out as if trying to learn the essential landmarks and topographical features of an unfamiliar terrain. At this time it was a common experience to hear the *tseerk* calls of Blackbirds flying above the roof-tops in daylight just like visiting autumn migrants or subordinate birds during the time of territory establishment.

Throughout the dawns of April and May I never heard more than two males in song from my house, whereas in every previous year from 1951 I had never heard fewer than thirteen. The lack of general bird-song was commented upon by several of my not so ornithologically-minded neighbours; certainly it was a unique experience. Incidentally, amongst the other breeding species Great Tits *Parus major*, Wrens *Troglodytes troglodytes*, Pied Wagtails *Motacilla alba* and Chaffinches had disappeared; Robins *Erithacus rubecula*, Song Thrushes and Woodpigeons were down by 63%, Greenfinches by 50%, Dunnocks *Prunella modularis* by 40%, Blue Tits *Parus caeruleus* by 23% and Starlings by 20%, but there were no changes in the populations of House Sparrows, Tawny Owls *Strix aluco* and Carrion Crows *Corvus corone*. Within some 180 feet of my house there are in most years at least 15 territories occupied by Blackbirds; in the summer of 1963 13 of these lay unoccupied (fig. 1).

The Blackbird population had been reduced by 55%. Beven (1963) has shown that there is usually a smaller breeding population of Blackbirds following a cold winter; he reported that up to 1963 there was no evidence that birds left the woodland at Bookham Common, Surrey, in the colder months, but that in the exceptional weather of January 1963 some Blackbirds probably did so. Seel (1961) indicated that the fewer the hard days in winter the larger the population of Blackbirds in the following breeding season. A large number of this species appeared to have died in Hampshire and Dorset early in 1963 (Ash 1964).

It has been known for some time that the Blackbird as a species shows a marked tendency to breed where it is reared. Werth (1947) found that 72% of summer recoveries of Blackbirds were in the places where they were ringed and that just under 50% stayed there all the year round. The same author also showed that 93% of British Blackbirds

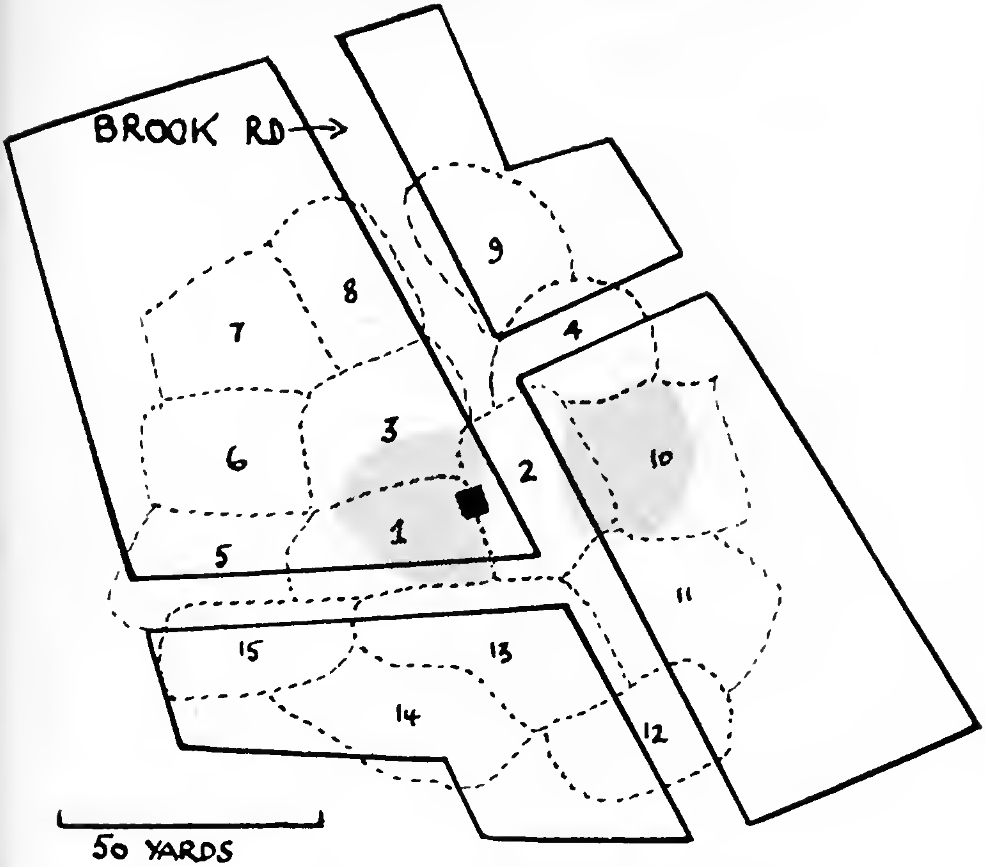

FIG. 1. The ancestral Blackbird *Turdus merula* territories covering some 40 houses and gardens within 180 feet of the author's house (shown as a black square) in Brook Road, Dollis Hill, London. In 1963 only two of these territories were occupied—roughly 1 and 10 with considerably modified boundaries—and these are marked as stippled areas

ringed as nestlings and recovered in later breeding seasons were within five miles of their birthplace; in effect, this means that there is little interbreeding between different groups of Blackbirds. This suggests that, after their departure in early January 1963, a catastrophe elsewhere overcame more than half the Dollis Hill population which therefore did not return or, alternatively, that a highly sedentary population had lost the ability to 'home'.

Throughout the 1963 breeding season the only Blackbirds that filtered in to fill up any of the empty spaces were a cock and two hens. This indicated that there was a similar shortage of Blackbirds in areas immediately adjoining the study area so that no 'spill-over' was possible. A classic experiment described by Stewart and Aldrich (1951), in which 81% of 148 males of various territorial species in forty acres of spruce-fir forest in America were killed off, showed how in normal times such a 'spill-over' can occur: from 15th June until 8th

July the numbers were kept at the reduced level, but this entailed the shooting of 455 new birds which had settled, including twice as many males as were present before the experiment started. In the following year 79% of 154 pairs in the same tract were killed and numbers maintained in the same way as before; this time 528 new settlers were collected (Hensley and Cope 1951). This made it clear that the presence of settled birds acts as a deterrent to would-be settlers and that unoccupied areas are more readily colonised than occupied ones, other things being the same. We do not yet know how in north-west London, for example, the annual process of Blackbird production is carried on, since the over-production of favourable Blackbird habitats must be absorbed by less favourable ones. This entails a certain amount of local movement. Other populations may remain stable through the years. What is clear is that the bad weather of 1963 punched a large hole in the population of north-west London. Although settlers might spread in from the fringe it would take more than one breeding season for some of them to reach the centre.

In their review of the effects of the severe winter of 1962/63 Dobinson and Richards (1964) noted that species 'apparently not adversely affected by the weather include three, the Mallard, Buzzard and Blackbird'. Nevertheless, they also pointed out that the number of B.T.O. Nest Record Cards for the Blackbird fell from 3,109 in 1962 to 2,000 in 1963—a drop of 36%. This discrepancy, they remark, is 'not easily accounted for'. According to their report the Blackbird was exterminated in only two localities, had large decreases in only 36 and showed slight decreases, no changes or even increases in no less than 125. Of 195 Blackbirds ringed in Britain after 1st October 1962 and recovered by 1st March 1963 only 22% had moved more than 30 miles. Yet it would seem probable that the larger part of the Dollis Hill population moved perhaps west or south in early January—even out of Britain—to an area where conditions proved too severe. In this connection, it is worth noting that Dobinson and Richards quoted reports from the Continent which showed that Blackbirds suffered heavily in Brittany and Luxembourg. However, it is remarkable that there should have been so large an evacuation from a suburban area where food and water were provided in considerable quantities.

Although suburban gardens provide much of what a Blackbird requires, roosts are often few and this may cause the birds to leave their territories. A *Philadelphus* in my garden—an ancestral breeding and roosting site—was vacated early in the cold weather and many others gave little shelter. Conditions at night were, of course, very grim. Wind chill—the dry convective cooling power of the atmosphere—was at its worst in London on 30th December 1962 and 7th January 1963, and the cooling effect of air movement and low temperature may have

forced the birds out of the district. Starlings were continuing to roost in central London at this time. It would be valuable to learn the position of Blackbirds at the same period in other London suburbs; I know that Blackbirds seemed scarce or absent in Neasden, Stonebridge Park and parts of Hendon and Ealing.

NUMBERS IN THE WINTER OF 1963/64

If the 86 pairs which nested in 1963 had a survival rate through to spring of 1.7 young per pair (page 36), the expected population figure in the spring would be 172 adults+146 young=318. With a mortality rate of 35% of old Blackbirds the final total would read 318−60=258, or 129 pairs. If one assumed that no more outside birds were coming in there would be something of the order of 60 territories still unclaimed. For the 1963 summer breeding population to have made up the numbers to those of 1962 it would be necessary to postulate a survival rate of 5.0 young per pair, an impossible figure. During the winter of 1963/64 the population was below strength. An indication of this was that my local winter roost and a larger one some three-quarters of a mile away were 35% and 30% down respectively.

THE POPULATION IN THE SPRING AND SUMMER OF 1964

By mid-March 1964 it was clear that there had been an increase in the number of young males, both in Gladstone Park and in some of the gardens. Two dawn censuses made during the fortnight from 25th March to 6th April revealed the astonishingly high total of 244 singing males. This was 26 more than in the exceptional spring of 1958. The concentration of birds was so high that along one 400-yard stretch of road I could hear more than 30 Blackbirds in song. The early morning chorus of Blackbird song at this time was one of the most memorable and beautiful experiences of the 21 years in which I have known this area. Most of the singers were on houses and in trees in the gardens. In Gladstone Park and among the factories to the north-east numbers were comparable to those of previous years; the real crush was among the 330 acres of houses and gardens. It was impossible to find out the ages of all the males singing, but it was clear that there was a high proportion of young birds and two exact samples bore this out.

This is the time of the year when the young leave their preferred feeding grounds in more open parkland to take their place in the garden districts (Snow 1958). With some 86 or 87 pairs nesting in 1963 and only about 56 old males surviving to 1964, there would be some 134 territories out of approximately 190 available. The old traditional 'pattern' of territories handed down from generation to generation had now disappeared. A few of the old territories would survive, but there was now no group memory of the others.

Song continued with an unparallelled brilliance; display and fighting were fierce and unrelenting and it was clear that the whole territorial lay-out was in a state of flux. Nest-building started, but it was spasmodic, uncertain in its choice of site and often interfered with by territorial fights. By the end of April the number of pairs had settled itself at about 200—a total exceeded only once before, in 1958. Some of the young Blackbirds that had come into Dollis Hill were unable to settle and had to go elsewhere.

The uncertainty of the March-April period is well shown by the behaviour of the Blackbirds nesting near my house. In the first week of April a pair built in a *Philadelphus*—the nucleus of an ancestral territory close to my house. During construction these birds were harassed by two other pairs near-by and they finally deserted. On 22nd and 23rd April the hen of this particular pair tried to lodge bits of grass between a swinging television cable and the side of my house—a site never previously attempted. On the following two days she successfully completed a nest behind some posts and against the wall close to the house. Four eggs were laid, but these were deserted after four days. After this failure the pair returned to the *Philadelphus* once more, half finished a nest and again were forced to desert. After a few days a fifth attempt was made in an apple-tree some twenty yards from the house and this too was abandoned. Finally, a nest in an elder, still within the confines of the old territory, produced two fledglings. The breeding success was low and this was largely attributable to the disturbance resulting from competition among the local birds. In my own garden three nesting sites were attempted in places never used before in thirteen years. Such experimentation under pressure was something that I had never witnessed before in the territory nearest to the house and best known to me. It will be interesting to see which sites are prospected and selected in 1965.

SUMMARY

This paper records the fluctuations in the number of Blackbirds *Turdus merula* at Dollis Hill in north-west London as the result of the severe weather of 1962/63. The annual behaviour patterns, including those of acquiring territory, pair-formation, song and nesting are described. Normally some 185-195 pairs nest within the study area.

Unlike the winters of 1955 and 1961/62, the cold weather of January 1963 resulted in the almost complete evacuation of the area by Blackbirds until 20th February 1963. In the spring of 1963 only a small proportion of the population returned and the number of breeding pairs was reduced by 55% to 86 or 87. Within 180 feet of the author's house 13 territories were not occupied. It would seem probable that the greater part of the Blackbird population of Dollis Hill was 'wrecked' elsewhere, perhaps in the south and west of England or even on the Continent. During the winter of 1963/64 numbers were still down by 30-35%.

In the spring of 1964 a large number of singing male Blackbirds, far in excess of the previous territorial strength, was counted. Fights contributed to a low breeding

success, although the final number of pairs nesting settled at 200—a total exceeded only once before, in 1958.

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Flight patterns of the European bustards

By Philip J. Stead

THE BUSTARDS, as a family, are terrestial birds and spend the major part of their time on the ground, but both the Great Bustard *Otis tarda* and the Little Bustard *O. tetrax* frequently indulge in short flights and take to the air readily if approached. Being a desert species, the Houbara Bustard *Chlamydotis undulata* is less inclined to fly than the other two, preferring to crouch. However, in flight all three have

distinctive wing-patterns which enable them to be identified at a considerable range.

Few British bird books contain illustrations of any of the bustards on the wing. The revised edition of *The Popular Handbook of British Birds* (1962) figures the male and female Little Bustard in flight on page 172, whilst *A Field Guide to the Birds of Britain and Europe* (1954) shows the Great Bustard in flight on plate 26. However, this latter illustration, as several ornithologists familiar with the Great Bustard have pointed out, is not entirely accurate and I am told that it has unfortunately not been possible to correct the plate in the forthcoming revised edition of this work. It was felt, therefore, that it might be helpful to illustrate the wing-patterns of these three species together, in the light of existing knowledge.

The accompanying drawings of the Great, Little and Houbara Bustards are based on field sketches made in Austria, Spain and Suffolk respectively, but the extensive skin collections at the British Museum (Natural History) and the Liverpool Museum have also been examined.

On the wing, the male Great Bustard is unlikely to be mistaken for any other species. The bird is heavier and deeper-chested than a Mute Swan *Cygnus olor* and has longer wings, which are held down-curved like those of a Heron *Ardea cinerea*. The wing beats are powerful but slow, about the same speed as those of a Heron, the wings beating through a fairly shallow angle both above and below the horizontal. The female Great Bustard is smaller and looks about the size of a Grey Lag Goose *Anser anser* in the air. The wing patterns of both sexes are similar—a broad white band along the upper primaries and secondaries running almost the full length of the wing, the trailing edge of which is black. As with the Little Bustard, the primary coverts are surprisingly long and the dark tips form a patch on the leading edge of the wing.

The Little Bustard is much smaller and looks about the size of a Mallard *Anas platyrhynchos* on the wing. Indeed, in sustained flight or when rising from the ground the bird can appear rather duck-like as it flies with its neck extended and the wing action is similar to that of the Mallard. On the breeding ground, where the Little Bustard does not normally fly any distance, the wing beats are usually shallower and mainly below the horizontal, the wings being held decurved like those of a Red Grouse *Lagopus lagopus*. In level flight the bird has a tendency to glide, merely flicking its wings downwards at intervals which emphasises the grouse-like effect. The male can have a swollen-necked appearance at times, particularly if flushed whilst displaying. His wings also make a distinctive whistling sound, which perhaps serves to alert other bustards in the vicinity if the birds are feeding in tall herbage and out of sight of each other. This sound, which is

Flight-sketches from side and rear of (top) Great Bustard *Otis tarda*, (right centre) female and male Little Bustard *O. tetrax* and (bottom) Houbara Bustard *Chlamydotis undulata* (*drawn by P. J. Stead*)

audible at some distance, may be caused by the peculiarly short and emarginated fourth primary, an adaption which is unique in the bird world.

Except for the coverts the wings of the Little Bustard appear largely white in flight, although there is a black area on the forewing formed by the tips of the primary coverts and the leading four primaries. The visible portion of the first primary is black for virtually its full length, but when the bird is in level flight and the primaries are not fully spread this may be obscured so that there appear to be two separate patches of black on the wing. The male also shows a white rump and in breeding plumage the neck pattern contrasting with the grey head is visible at a considerable range.

The Houbara Bustard has three races which show much variation in both size and colour, particularly of the back and tail. The Asiatic race *C. u. macqueenii*, to which all the British records refer*, is the largest and palest of the three. In size, males of this form approach that of the female Great Bustard, but the wing pattern of the Houbara is quite different, the primaries and secondaries being largely black with a prominent white patch on the forewing. The pale grey greater and median coverts form a band across the wing, the lesser coverts and back being sandy brown, finely vermiculated with black. In flight, seen from the rear, the wings are kinked at the carpal joint like those of

*H. E. Axell in his note on the Suffolk Houbara (*Brit. Birds*, 57: 247-249) concluded that subspecific identification of this individual was impossible because of a number of conflicting characters. This conclusion was based on the description of the African race *C. u. undulata* in R. Meinertzhagen's *The Birds of Arabia* (1954: 548) and that of the Asiatic race *C. u. macqueenii* in *The Handbook* and J. A. Murray's *The Avifauna of British India and its Dependencies* (1880-90: 575).

Having examined the large series of skins of all three subspecies of the Houbara in the British Museum (Natural History) only a week after seeing the Suffolk bird, I must beg to differ with Axell's view, as I am quite certain that this individual belonged to the Asiatic form, *macqueenii*. The much broader and coarser bands of black on the mantle of *undulata* give it an altogether darker appearance which alone is quite sufficient to distinguish it from *macqueenii*. In fact, the two races are so dissimilar that at one time they were considered to be separate species.

In the light of Axell's note, R. Wagstaffe kindly examined the Houbara skins in the Liverpool Museum collection. Both the number of tail bands and the amount of white on the neck plumes (the conflicting characters referred to above) vary in both forms and Wagstaffe does not consider that either could be used to separate the two races. On the other hand, all the skins in the Liverpool collection can be separated at once by the colour of the long feathers on the fore-neck, which are grey in *macqueenii* and white in *undulata*, and by the black feathers on the crown of *macqueenii*, which are absent in *undulata*. The black crown feathers were very prominent in the Suffolk bird and are mentioned in Axell's description.

At least one of the previous British specimens, that shot near Redcar, Yorkshire, on 5th October 1892, is still in existence, being preserved in the Hancock Museum, Newcastle upon Tyne. It is a typical *macqueenii* and almost identical with the Suffolk bird, including the absence of any white on the neck plumes.

a Stone Curlew *Burhinus oedicnemus* and the wing pattern is, indeed, reminiscent of this species. The wing action, however, is much slower, the strokes being through a fairly shallow angle both above and below the horizontal.

Like the Little, the Great and Houbara Bustards extend their necks in flight, which in their case accentuates the rather goose-like effect of the slow wing beats.

I should like to thank the authorities at the British Museum (Natural History) for allowing me to examine skins of the bustards and R. Wagstaffe at Liverpool Museum for the same facility and for his help and guidance on several points. I am also grateful to I. J. Ferguson-Lees, P. A. D. Hollom and D. I. M. Wallace, who read this article in draft and made many helpful suggestions.

Studies of less familiar birds

132. Spur-winged Plover

By I. J. Ferguson-Lees

Photographs by D. A. P. Cooke, Harold Platt, Eric Hosking and Ilse Makatsch

(Plates 9-12)

THE SPUR-WINGED PLOVER *Hoplopterus spinosus* is one of a number of round-winged plovers with much black and white in the plumage (notably on the wings and tail), which are now generally united in the genus *Vanellus*. Most of this group differ from other plovers in having crests and at least rudimentary wing-spurs, while some also have facial wattles. Apart from the Lapwing *Vanellus vanellus*, the majority are African, though some are found exclusively in southern Asia. The Spur-wing's main range is from southern Turkey, Syria, Jordan, Israel and Egypt southwards through eastern Africa to the Equator and westwards across tropical Africa south of the Sahara to Senegal. Along with the Palm Dove *Streptopelia senegalensis*, Isabelline Wheatear *Oenanthe isabellina* and Ashy-headed Bunting *Emberiza cinerea*, however, it has also recently been found nesting regularly in south-east Europe.

Current editions of the *Field Guide* say that this species occurs in north-east Greece and European Turkey, 'where it may breed'. This last statement, first published in 1954, was based on the fact that there had been occasional records of Spur-winged Plovers in the south-east Balkans since way back in the nineteenth century. Most had been in spring and were probably migrants which had overshot their range but

over the years they included enough in the summer (and odd ones through to October) to raise a suspicion of nesting. The nearest places where breeding is known to have taken place are Asiatic Turkey (doubtless regularly, though there seems only one authenticated record as long ago as 1913) and Cyprus (intermittently, but now usually shot). Then suspicion grew into near certainty in the 1950's when there was a scattering of observations in the extreme north-east of Greece (Thrace), chiefly at Porto Lago and on the delta of the Evros, where Watson (1961) collected four Spur-winged Plovers with enlarged gonads and saw three or four others in late March and early April 1954. Finally, on 4th May 1960 this same ornithologist found a nest with four eggs at Porto Lago; only eight days later Bauer (1960) located an incomplete clutch of two eggs in the estuary of the Gallikos on the Gulf of Salonika well over a hundred miles further west; and soon afterwards, still in May 1960, Raines (1962) recorded another nest with four eggs at Porto Lago (exact date not published, but during the 14th-22nd).

That year saw a total of three or four pairs at Porto Lago (Austin, Raines), four pairs some 40 miles to the west on the delta of the Nestos (Raines) and the birds at Gallikos (Bauer). The next year, 1961, Raines and his companions found only two pairs on the Nestos delta owing to flooding, but no less than eight at Porto Lago and five on the Evros delta: three nests were found at Porto Lago and one of these is that which appears on plates 9 and 10 (see also plate 12a). In 1961, too, Makatsch (1962) located the species in another part of the Gulf of Salonika, where plates 11b and 12b were taken, and since then the bird has gone from strength to strength. In 1962, for example, there were at least 19 pairs on the Nestos delta (Helversen 1962) and there are now two clearly established breeding zones, one between the deltas of the Nestos and the Evros (including Porto Lago and several other sites) and the other in the Gulf of Salonika (the estuaries of the rivers Gallikos, Axios and Aliakmon). In Africa, and perhaps the Middle East, the species is resident, but it is proving a summer-visitor to Europe, mainly during March-August.

Is this a new colonisation or have these birds been overlooked in the past? Certainly more ornithologists have been visiting Greece in recent years, but this is a very conspicuous species with strikingly contrasted black and white head and under-parts and much black in the wings and tail in flight; it is also even more noisy and demonstrative

PLATE 9. Spur-winged Plovers *Hoplopterus spinosus* at n
Greece, May 1961. This wader has bred in Greece since 19
and these are among the first European photos. The lower b
is settling on the eggs and the feathers over the brood patc
are erect (pages 47-51) (*photos: Harold Platt and D. A. P. Co*

PLATE [illegible]. Spur-winged Plovers *Hoplopterus spinosus*, Greece, May 1961. Above, the bird is balancing on its tarsi over the nest in the mid-day heat so that the eggs are in shadow and exposed to a slight draught (page 50). Below, approaching the nest and eggs with characteristic gait (*photos: Harold Platt and D. A. P. Cooke*)

PLATE 11. Above, Spur-winged Plover *Hoplopterus spinosus*, Jordan, April 1963 (*photo: Eric Hosking*). Below, another Greek nest, May 1961 (*photo: H. Makatsch*). All these plates show the simple but striking pattern of black, white and sandy-brown, the drooping scapulars and the longish legs of this Lapwing-like species

in the breeding season than the Lapwing. Odd pairs may well have bred in Greece in the past, but these concentrations in Thrace and Macedonia are surely a development of the last decade and the evident build-up in numbers supports this. Also, whereas Bannerman and Bannerman (1958) believed the species to be 'an increasingly rare visitor to Cyprus', the activities of the Cyprus Ornithological Society since 1957 have shown that in recent years 'small numbers occur regularly around inland waters' between March and May (Bulletin 15, 1964: 25). At the same time a pair and a single bird at Lake Mandra near Burgas in Bulgaria provided the first records for the present boundaries of that country (Hanzak 1962, Donchev 1964); these evidently did not breed, however, because the British expedition there that year (Mountfort and Ferguson-Lees 1961) could find no trace of them in late May and early June.

If collectors of eggs and skins will give these birds a chance—and I have included localities here only because they have all already appeared in print—there seems no reason why this strikingly handsome species should not build up a reasonable population in what is left of suitable habitats in the Balkans.

Three habitats are shown on plate 12. In Greece and the Middle East this is a bird of sand, mud or marsh near open water, often with a low growth of *Salicornia*, *Juncus* and other vegetation, but elsewhere it also breeds in young crops. It is sometimes stated to be a freshwater species, but at least in these northern parts of its range it seems to be more associated with a low salinity. In Greece Raines found it occupying a brackish zone between the saline Avocet *Recurvirostra avosetta* and the freshwater Lapwing and it appeared to be occupying a similar niche in Jordan where in 1963 we found some eight pairs at the large saline oasis of Azraq. The nest is a simple scrape in mud or sand, usually rather scantily lined with pieces of grass, rush, wood, shell, dung or other materials from near-by, but such nests as that on plate 11b and two of those reported by Raines show that, as in the case of the Lapwing, these accumulations may sometimes be more substantial.

As with most other plovers the normal clutch is four, but both three and five have been recorded and the species may possibly be double-brooded (e.g. Bannerman and Bannerman 1958): the eggs (best seen on plate 9) are not unlike those of the Lapwing, yellowish-brown or stone to greenish, thickly spotted and blotched with black or dark brown, but they are noticeably smaller: Bauer quoted E. Hartert's

12. Nesting areas of Spur-winged Plovers *Hoplopterus*
. Top, that of plates 9-10 in north-east Greece (*photo:*
Platt and D. A. P. Cooke). Centre, that of plate 11b, also
but further west (*photo: Ilse Makatsch*). Bottom, that of
11a, a muddy islet in a Jordan marsh (*photo: Eric Hosking*)

Die Vögel der Paläarktischen Fauna (1910-38) to the effect that 30 eggs averaged 40.28 × 28.55, while *The Handbook*'s average for 100 Lapwing eggs is 47.09 × 33.71. There was a gap of two days between the laying of the third and fourth eggs in the Jordan nest on plates 11b and 12c and, like the Lapwing, this species may regularly lay on alternate days.

The literature on the Spur-winged Plover has increased to a significant extent since the discovery of the breeding population in Greece. Apart from the papers already mentioned, Helversen (1963) published a short study of behaviour and breeding biology (illustrated with sketches and photographs) which suggested significant differences from the Lapwing, in which case there might have been grounds for the retention of the genus *Hoplopterus*. However, Stiefel (1964) has pointed out that each supposedly characteristic posture or action described by Helversen has a parallel in the more familiar species.

The male Spur-winged Plover takes a larger share in incubation than does the male Lapwing, as one might expect with a species which nests in hotter climates, and Crossley (1964) has recently drawn attention to the wetting of the under-parts before the change-over as a means of correcting for either humidity or temperature. Another method of apparent cooling is shown on plate 10a where the bird concerned is balancing on its tarsi so that its body is clear of the eggs, thus casting a shadow and allowing a slight draught; this was a regular attitude at this particular nest at mid-day when the sun was hottest.

The characteristic gait and striking plumage of the Spur-winged Plover are commented on in the captions to plates 10 and 11. The colours and field-characters in general speak for themselves in these photographs, but it should be added that the species is slightly smaller than a Lapwing and that in flight the undersides of the wings show a striking contrast between black primaries and white coverts. The species is particularly noisy when approached on its breeding grounds and its main call is a loud *zic-zac-zac*.

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Europe takes stock of its birds

Special Review by P. H. T. Hartley

Report on the Working Conference on Birds of Prey and Owls (Caen, France, April 1964). Published by the International Council for Bird Preservation, London, 1964. 140 pages; 8 half-tone plates. 17s. 6d.

Proceedings of the First European Meeting on Wildfowl Conservation (St. Andrews, Scotland, October 1963). Published by the Nature Conservancy, London, 1964. xxvi+289 pages; 14 half-tone plates. 25s.

Son of Heav'n and Earth,
Attend: that thou art happy, owe to God;
That thou continuest such, owe to thyself,
That is, to thy obedience; therein stand.

SO, IN 'PARADISE LOST', the Archangel admonishes Adam; the admonition is one that every twentieth century ornithologist must lay to heart. The horrifying speed with which the world's capacity to support a wild fauna at all is being reduced makes nonsense of the assumption that there will always be birds to delight the generations of naturalists to come. We must all be conservationists now, taking active steps to preserve the great entail of nature and accepting, as cheerfully as we may, the restrictions which we ourselves must make. The proceedings of two conferences, one on wildfowl at St. Andrews in the autumn of 1963 and the other on predatory birds at Caen in April 1964, help to make clear the seriousness of our position and put forward recommendations for the policies of the future. They do much more also. They signal the recognition of the fact that conservation measures must extend beyond national boundaries as freely as

do migrating birds. At last Europe is moving towards that concerted action in bird preservation which has been enjoyed in North America for nearly half a century.

The report on the conference on birds of prey and owls makes the more depressing reading. The first session was opened by a valuable paper by Dr. Kai Curry-Lindahl on 'Birds of prey and their environment', stressing the complexity of the relationships between predators and prey species and making mention of the fact that one of the major problems of game conservation is not that of securing an adequate stock, but that of keeping the stock within the carrying capacity of the environment, so that the carnivorous species are, in fact, co-operating with the game preserver! Dr. Curry-Lindahl also drew attention to the ease with which inept efforts to increase some 'desirable' species by the elimination of predation may merely open the flood gates to a disastrous interspecific competition, at the same time removing the agency whereby natural selection exerts a sanitive influence. Dr. J. D. Lockie's account of the work of the Nature Conservancy in the United Kingdom emphasised Dr. David Jenkins's conclusions that Golden Eagles *Aquila chrysaëtos* preying upon Red Grouse *Lagopus l. scoticus* take only those 'surplus' birds ejected from the favourable environment and doomed to die by the grouse's intraspecific density-regulating mechanisms; in the western Highlands of Scotland complaints about lamb-killing by eagles were, in fact, complaints about the direct results of man's own unwise exploitation of the environment. Dr. Heinz Brüll, in a report upon predation by Goshawks *Accipiter gentilis* and Sparrowhawks *A. nisus*, stressed the capacity of predators to regulate the population structure of their prey species, but not to limit their numbers.

So far, so good; all is sweet reasonableness and sound observation, and one feels that, so far as an ever-shrinking environment permits, birds of prey will receive rational treatment. In the second session the reader of many of the papers scarce knows whether to weep or swear. The account of the rewards paid for diurnal birds of prey by the Belgian Federation of Pigeon-Fanciers (91,999 in nine years between 1951 and 1961), the melancholy schedules of birds listed as 'harmful' in the administrative departments of France and J.-F. Terrasse's no less melancholy report on 'The status of birds of prey in France' make one wonder how the diurnal birds of prey can possibly take such a hammering. The French delegates openly declared that their country was a hundred years behind the times in its attitude towards birds of prey, and urged the need of a 'propaganda campaign by all the modern methods'. Education can certainly do much (for example, *Peter Penniless, Gamekeeper and Gentleman*, a boy's classic of 80 years ago, figures a pole-trap with a description of its use and

describes the shooting of a pair of Peregrines *Falco peregrinus* as soon as their full clutch of eggs has been taken: no responsible author now would include such abominations in his hero's activities), but is there still a hundred years available to produce a change of heart before the hawk fauna has been obliterated?

The third session with a number of papers on some other parts of Europe is a little less tragic, though still far from satisfactory. In Italy there exists the quite fantastic situation that a landowner cannot prevent the slaughter of birds on his own ground by anyone equipped with a hunting licence, unless that ground be enclosed within an effective fence not less than six feet high! In Norway the decrease of the Gyr Falcon *F. rusticolus* (never abundant) seems to be due to the general increase in temperatures and the recession of the boreal and high arctic faunas; it is encouraging to know that in that country efforts are being made to secure the protection of the White-tailed Eagle *Haliaëtus albicilla* and the Golden Eagle. In the Tyrol the Golden Eagle has been accused of disseminating scabies among Chamois *Rupicapra rupicapra*, but, on the basis of the distribution of eyries in relation to the infected area, a paper by Dr. Franz Niederwolfsgrüber suggested that the eagles may be a significant factor in combating the disease.

The preoccupations of the wildfowl conservation meeting were wholly different from those of the birds of prey conference in that all the nations represented were agreed that ducks and geese are highly to be desired, if only as a target or upon a plate. There is no preliminary battle to secure good will.

The first section of the proceedings of that meeting embodies a number of reports on the 'wildfowl situation' in many European countries and in North Africa, with more detailed statements on Long-tailed Ducks *Clangula hyemalis* and Brent Geese *Branta bernicla*, and with a summary and suggestions for future work by Dr. G. V. T. Matthews. In this section an 'Analysis of the catches of Dutch duck decoys' will be of interest to the British reader, to whom these decoys have long, and quite unjustifiably, been something of a bogy.

The second section, on 'The future of wildfowl reports and information', contains a valuable and succinct account of the methods of the migratory wildfowl surveys in North America and of the utilisation of the data in the regulation of wildfowl hunting in the U.S.A. (by the time he had reached page 289 the reviewer had got accustomed to the use of the word 'hunting' for shooting). It is obvious that this remarkable and effective piece of international co-operation dominated much of the thinking of the conference, as here the exploitation of a natural resource is based upon rational deductions from numerical data. The flexibility of control of open and close seasons in the United

States stands in sharp contrast to the rather rigid legislation of European countries. Diversities of practice were the subject of a long and sometimes slightly acrimonious discussion, under the chairmanship of Dr. H. Offner, with Miss Phyllis Barclay-Smith as Rapporteur Général: this section is well illustrated with instructive maps. The close and cordial co-operation between wildfowlers and protectionists which has been so pleasant a feature of post-war ornithology in this country seems to be general over Europe.

Dr. L. Hoffmann's paper on 'Wildfowl refuges in Europe and the Mediterranean' set the board for much of the discussion of the rest of the conference. It is not suggested that some species are not being over-shot (Dr. Curry-Lindahl indeed pointed out that shooting accounts for 70% of the total mortality of the Mallard *Anas platyrhynchos* in Sweden and that this may prevent the species from attaining a population level corresponding to the carrying capacity of that country), but the destruction or spoliation of habitats through much of Europe is at once a matter for deep concern and a danger which can be met by local, and therefore relatively swift, action.

In every country the extent of wetlands (is there no synonym for this horrible neologism?) is being steadily decreased by land reclamation and drainage schemes; by the dumping of spoil or urban rubbish; by the construction of docks and seaside towns; by the conversion of marshy areas into reservoirs; by the canalisation of rivers; and by plain ecological succession. In certain cases, notably Lake Constance in Switzerland, ecological succession within lakes has been accelerated by pollution with organic matter; this augments the 'productivity budget' of the waters and, at the same time, drastically alters the fauna. Many sites not physiographically altered are rendered untenable to wildfowl by the increase of such sports as sailing and water-skiing and by general disturbance by holiday makers. Not all modern developments are necessarily unfavourable, however: excavations of sand, gravel or clay, when flooded, and reservoirs, especially those in comparatively flat country, provide admirable wildfowl refuges, and in some countries where ill-advised reclamations have been attempted the abandoned areas may make good duck marshes. More than one delegate reported a certain decline in official enthusiasm and financial backing for drainage schemes.

The St. Andrews Conference made 17 recommendations, mostly addressed to the Conseil International de la Chasse and to the International Wildfowl Research Bureau. Those most affecting the individual wildfowler and naturalist request that the grant of a shooting licence should be dependent upon a sufficient knowledge of conservation laws and quarry identification and that part of the revenue from licences should be devoted to research and practical conservation

measures; that all governments should make provision for the introduction of a close season in exceptionally cold weather; that shooting from mechanically propelled boats and all shooting after 31st March should be prohibited; and that the Brent Goose should everywhere receive full protection.

Persecution by gamekeepers and *lieutenants de louveterie*; the enmity of poultry-keepers, shepherds, pigeon-fanciers and game-farmers; the slaughterous folly of the merely ignorant; the depredations of egg-collectors and the interference of bird-photographers; over-shooting; the destruction and disturbance of biotopes: some or all of these the various species of wildfowl and birds of prey have to face. Behind all these dangers stands one more menacing still—the pollution of the total habitat by toxic chemicals. Here is a threat that faces every species, a threat all the more alarming because we do not know its full extent nor the measure of its duration. Stanley Cramp and Dr. W. Przygodda read papers at the birds of prey conference on the menace of insecticides, more especially the persistent chlorinated hydrocarbons, and of rodenticides; and in the discussion that followed the threat not only to wild life but to man was advanced. This threat may be by direct intake of toxic substances or by more round-about methods. Professor J. Berlioz instanced a case in tropical West Africa where the suppression of an endemic disease transmitted by fish parasites resulted in the destruction of most of the fish, which happened to be the principal food of the people living in the area. At the wildfowl conference there was but one short paper on organo-chlorine contamination, but it was obvious that the threat from insecticides was much at the back of the minds of all the delegates: the fourth 'recommendation' was concerned with the strict control of persistent chlorinated hydrocarbons, and urged 'research on alternative methods of control without delay'. One short sentence at the end of a discussion drew attention to the menaces hidden in schemes of insect control in which the full ecological implications have not been adequately worked out: 'We are very concerned at the moment,' said the Director of the Migratory Bird Population Station at Laurel, Maryland, 'about a grasshopper control programme in the Canadian pothole region'. The reason for concern is that this is one of the major breeding areas of the North American duck population.

Finally, where does the individual ornithologist come into this picture? Discussion was largely between representatives of official or authoritative bodies, and some of the recommendations of the wildfowl conference will eventually, it is to be hoped, be agreed between 'high contracting parties'. Is there any immediate, personal duty for the bird-watcher and the wildfowler? In the first place there is the loyal acceptance of restrictions—restrictions on bags, restrictions on addi-

tions to the 'life tally', restrictions on photographic ambitions, restrictions on the pursuit of legitimate research projects. In this country the Wildfowlers' Association of Great Britain and Ireland has done a great work in encouraging the voluntary acceptance of bag limits which to the fowler of two generations ago would have seemed merely risible. In the second place we are going to have to learn to restrict ourselves and, in these overcrowded islands of ours, to be much more sensitive to the effects of the disturbance factor. The preservation of much that is noblest on our avifauna is going to call for a 'Self-denying Ordinance'—that the ornithologist of today should deny himself (for example) the delight of inspecting eagle's eggs in the nest in order that the ornithologists of tomorrow may have the delight of seeing eagles in the air.

In his opening address to the birds of prey conference the President d'Honneur of the Conseil International de la Chasse urged upon the representatives the need of a sense of the practicable in any recommendations which they might put forward for changes in legislation or in long-established custom. It is true that all may be lost by asking too much in negotiation; but time is not upon the side of the conservationists and the limits of the practicable must be stretched as far as tact can persuade and urgency can enforce.

[By way of a postscript, it is gratifying to be able to record that the Working Conference on Birds of Prey and Owls at Caen has already helped to produce results in two countries where there was little protection for these birds. In Belgium a royal decree in September 1964 considerably extended the list of birds of prey protected there, and in France a government ruling in December 1964 gave total protection (hitherto enjoyed in that country only by the vultures and most of the owls) to all the eagles, including the White-tailed *Haliaëtus albicilla*, as well as to the Short-toed Eagle *Circaëtus gallicus*, the Osprey *Pandion haliaëtus* and the Eagle Owl *Bubo bubo*. But in these countries, as in Britain, many gamekeepers and others confuse the species and totally misunderstand the part that birds of prey play in nature, and there is still the long path of education to be travelled between legislation and enforcement of the law.—I.J.F.-L.]

Notes

Unusual numbers of Sooty Shearwaters in the eastern English Channel.—A substantial passage of Sooty Shearwaters *Procellaria griseus* flying westwards down the English Channel was observed at Cap Gris Nez, Pas de Calais, France, at the time of a westerly gale at the end

of September 1963. Details of the numbers, together with those of associated sea-birds, are given in the accompanying table, from which it will be seen that the peak was 192 in 9½ hours on the 27th.

Sooty Shearwaters were also recorded flying west at Portland Bill, Dorset, but the main passage there, 113 west and 5 east, occurred on 29th September, two days after the peak at Cap Gris Nez. Two flew east at Portland the next day, and one and three west on 1st and 5th October respectively. Much the same species of other sea-birds were seen there as at Cap Gris Nez, except that more than 100 auks flew west on the 29th.

The largest numbers of Sooty Shearwaters occurred off Cap Gris Nez before 12.30 hours on the 27th, whereas nearly all the skuas passed each day from about 14.00 hours onwards. Most of the Sooty

Table. Sea-birds recorded flying westwards down the English Channel at Cap Gris Nez, France, in September 1963

The details given under each date include the wind direction and speed, and the total time during which observations were made. Skies were clear and visibility good on each day except the 26th, when there was heavy rain and thick mist, and the 29th, when there was 8/8 cloud (and drizzle at first). No observations were made after noon on the 29th. The round figures for Gannets and gulls are approximate; it should be added that up to 70 Gannets flew eastwards up the Channel on the 25th and 26th

	25th W force 6 4¼ hours	26th SW force 7 1 hour	27th W force 6 9½ hours	28th W force 4 8½ hours	29th W force 4 3 hours
Leach's Petrel *Oceanodroma leucorrhoa*			1		
Storm Petrel *Hydrobates pelagicus*				1	
Manx Shearwater *Procellaria puffinus*			27	5	1
Sooty Shearwater *Procellaria griseus*	1	1	192	6	1
Fulmar *Fulmarus glacialis*			3		
Gannet *Sula bassana*			130	200	29
Arctic Skua *Stercorarius parasiticus*	31	3	141	152	2
Pomarine Skua *Stercorarius pomarinus*			4		
Great Skua *Catharacta skua*				7	
Lesser Black-backed Gull *Larus fuscus*			40	500	400
Kittiwake *Rissa tridactyla*			1	100	

Shearwaters at Portland were seen between 11.45 hours and 14.00 hours on the 29th.

J. H. Phillips (*Brit. Birds,* 56: 197-203) has recently analysed the distribution of Sooty Shearwaters around the British Isles and such numbers in the eastern part of the English Channel appear to be unprecedented. Although P. Davis (*Bird Study,* 11: 108-110) has shown that there were unusual movements of sea-birds off many parts of the British coast in September 1963, the only other place that large concentrations of Sooty Shearwaters were seen was off south-west Ireland, where they are of more regular occurrence.

Phillips suggested that the normal route to the Atlantic taken by Sooty Shearwaters that reach the southern North Sea in autumn is round the north coast of Scotland. However, since all the shearwaters (and other sea-birds) at Cap Gris Nez in September 1963 were watched coming from the north-east and carrying on down Channel, and all but seven of those at Portland were flying west, there seems no reason to suppose that they had not come from the North Sea and were returning to the Atlantic through the English Channel instead of travelling north round Scotland.

We are grateful to F. R. Clafton for details of the observations at Portland Bill.

A. Gibbs, P. J. Grant, P. J. Oliver and C. A. Walker

Bathing behaviour of Canada Geese.—An account of somersaulting and submerging in the Canada Goose *Branta canadensis* has recently been given by Miss Christina L. Batty and Lee Cave (*Brit. Birds,* 56: 190-191). I have seen similar behaviour on a number of occasions, including the following instance for which I have full field notes.

During the summer of 1957, I made an intensive study of Great Crested Grebes *Podiceps cristatus* at Theale Old Gravel-pit, Berkshire. I spent many hours sitting on the bank and a family of Canada Geese, parents and three young, often came very close to me; they were very tame and used to being fed. On 7th August, by which time the young were full grown, the geese were feeding just offshore in water-crowfoot *Ranunculus* as I watched the grebes. The family then moved nearer into a pool of open water and my attention was drawn to it by the sound of loud splashing. The gander and the three young were bathing, making the normal, buoyant head-ducking and scooping movements under the water. In addition, the young were diving quite frequently, ducking their heads and then kicking under the surface with loosely held wings, raising much spray and disappearing totally for several seconds. Shortly after, the gander also started diving, but soon they all reverted to normal bathing without the 'escape' element. Then the somersaulting started.

Each bird, in its own time, would duck its head, but, instead of raising it again and scooping water over its back, would up-end and then fall over, purposely, on to its back. Usually it would turn sideways as it did so and come up the right way, but it would also often complete a full somersault, turning right over on its back in the water with feet kicking in the air, looking most peculiar with great white belly uppermost and no sign of head or neck. After each partial or complete somersault, it would beat its wings against the water in the usual bathing manner and then roughly preen various parts of its plumage, now glistening with drops of water, with rapid biting movements of its bill. At first the young, when they found themselves inverted under the water, would also dive as they twisted round to the normal floating position. The somersaulting went on for about ten minutes and then, one after another, the geese came out of the water on to the bank near me, wing-flapping and then preening and oiling their plumage.

Although the authors mentioned above make no specific mention of bathing movements, I believe that diving and somersaulting are, in fact, components of high intensity bathing sequences of the Canada Goose. Similar behaviour has also been recorded from the Grey Lag Goose *Anser anser* (*Brit. Birds,* 37: 158; and 38: 97) and the Mute Swan *Cygnus olor* (*Brit. Birds,* 40: 185-186; 41: 25; and 43: 303).

The presence of the diving and somersaulting needs explaining. Bathing is part of a functional sequence of feather-care activities which includes oiling and preening (see K. E. L. Simmons in *The New Dictionary of Birds*, 1964, ed. Sir A. Landsborough Thomson) and its first purpose is to wet the feathers. This requires special effort and co-ordinations in birds with waterproof plumage, such as grebes and geese, because their feather system is designed to keep the water out. Functionally speaking, one has not to look very far for the explanation of the appearance of diving and somersaulting, as these activities clearly increase the effectiveness of the feather wetting action of the bathing behaviour. However, this interpretation is not complete, for one needs to know more about the causal background. Diving behaviour in geese is otherwise an escape movement before predators. As is well-known, escape movements occur 'out of context' during bathing sequences in various ducks (e.g. T. Lebret, *Brit. Birds,* 41: 247), the usual explanation being that the escape behaviour is superimposed on the bathing as a 'vacuum' or 'overflow' activity (reaction to suboptimal stimuli).

A different interpretation has been offered recently by H. Lind (*Behaviour,* 14: 123-135) who concluded that 'the combination of different activities (including escape reactions) in the complicated bathing behaviour of some Anatidae may be due to the effect of transition actions . . .' He had noticed during his behaviour studies that a bird

might change unexpectedly from one form of behaviour to another in situations when there was no suggestion of thwarting (such as might produce a classic displacement-activity) and this was due to the activities in question having a common introductory action which he called a 'transitional action'. Among many examples, he recorded how Shelducks *Tadorna tadorna* might change over from bathing to feeding by upending or to diving, the head-dipping introductory action being common to all three.

In the Canada Goose the presence of diving during bathing can probably be attributed similarly to such postural facilitation and this interpretation may also be true of somersaulting, though here there may be a double process—the neck-dipping facilitating the up-ending and the latter facilitating the somersaulting. However, a fuller study is necessary because somersaulting may well be an integral movement of the bathing pattern in any case. It is not, I feel, a form of 'display' in the strict sense of the word, as implied in some of the notes on somersaulting cited above, though bathing does follow copulation in the Canada Goose (R. B. Klopman, *Living Bird*, 1: 123-129).

K. E. L. Simmons

Request for information

Past breeding success of Golden Eagles in Scotland.—In view of the disquieting report by Dr. J. D. Lockie and Dr. D. A. Ratcliffe of a marked decline in the nesting success of Golden Eagles *Aquila chrysaëtos* in a part of western Scotland (*Brit. Birds*, 57: 89-102), which they attributed to the use of dieldrin and other pesticides in sheep dips, the Royal Society for the Protection of Birds co-operated with the Nature Conservancy last summer in carrying out a survey of breeding Golden Eagles over a wider area. In order to make comparisons with the situation in the past, the R.S.P.B. is most anxious, as a matter of urgency, to obtain any unpublished data on breeding success, even at single eyries. Such information would be welcomed by the Scottish Representative of the R.S.P.B., **George Waterston, 21 Regent Terrace, Edinburgh 7.**

News and comment

Edited by Raymond Cordero

Ten years of 'The Ring'—*The Ring*, a journal devoted to the broad international aspects of bird-ringing, recently had its tenth anniversary. The first edition of this quarterly, which is edited by Dr. W. Rydzewski and published by the Polish Zoological Society, was issued in October 1954 as a 'medium of mutual discussion and exchange of information, experience, etc., among the bird banding centres of the world, and among the individual students of migration.' Among the contents of the 40th issue are contributions on an Asian international bird-ringing project, on bird-banding in South Australia (including some recovery details) and New Zealand,

and on the Baltic Commission for the Study of Bird Migration. There are also brief notes on various observatories' reports, a section on recent literature and some reviews. The journal is now the official organ of the International Committee for Bird Ringing, and Dr. Rydzewski is to be congratulated on the hard work he has put into building up its reputation. We wish *The Ring* continued success in promoting international co-operation in ringing.

Shooting and Woodpigeon numbers.—It is probably true to say that there is a widely held belief that shooting is a potent factor in the control of Woodpigeon numbers. However, in the view of R. K. Murton, N. J. Westwood and A. J. Isaacson, joint authors of a paper in the October issue of *The Ibis*, the present intensity of shooting could continue indefinitely without affecting the total population from year to year. The Woodpigeon population on an East Anglian estate was studied for a period of five years and the number at the beginning of the winter was positively correlated with the average amount of grain stocks on the autumn stubble. The Woodpigeon population is primarily determined by the level of the food supply, the authors maintain, and under present conditions it is unlikely that enough Woodpigeons could be killed by shooting to bring about a sustained population reduction.

Poisoning and narcotic baiting are techniques that are capable of achieving the degree of mortality necessary to reduce pigeon numbers, but at present they have justifiably been made illegal because their use would endanger other wildlife. Current government research is aimed at making narcotic baiting a selective process.

R.S.P.B. birthday dinner.—A dinner to celebrate the 75th birthday of the Royal Society for the Protection of Birds will be held on 30th March (6.45 p.m. for 7.30 p.m.) at the Connaught Rooms, Holborn, London, W.C.1. It is hoped that the speakers will include Lord Shackleton, Minister of Defence (R.A.F.), who has played a leading part in debates in the House of Lords on the threat of toxic chemicals to birds and other animals. The dress will be dinner jackets and a limited number of tickets (£2) is still available from the R.S.P.B., The Lodge, Sandy, Bedfordshire.

The Cage Birds Show.—The National Exhibition of Cage Birds, held as usual at Olympia early in December, again provided an opportunity of seeing something of the smaller birds—chiefly passerines and parrots—which are at present in captivity in this country, and which, following escapes, sometimes prove a snare for the unwary bird-watcher. It seems that more and more private owners tend to keep their birds at home, so that a better idea of the variety of current importation is obtained on the dealers' stands. Here there were Cardinals and Baltimore Orioles from America, Hoopoes from India, Bulbuls from Africa; other families represented included shrikes, rails, woodpeckers and bitterns, as well as many more usual ones. British migrants on show included Redstart, Black Redstart, Whinchat, Blackcap, Lesser Whitethroat, Chiffchaff, Tree Pipit and Yellow Wagtail, as well as Waxwing and Crossbill.

M.B.E. for H. E. Axell.—We offer our warmest congratulations to H. E. Axell on the award of the M.B.E. in the New Year Honours List. Bert Axell has been one of the most ingenious and industrious wardens of the Royal Society for the Protection of Birds since 1952, first at Dungeness in Kent and now at Minsmere in Suffolk. Many visitors to these places will have had occasion to remember his kindness and his advice. While at Dungeness he prepared a stimulating paper on the problems of predation and protection there (*Brit. Birds*, 49: 193-212) and at Minsmere he has been responsible for much of the development work which has resulted in the successful breeding of Avocets and the establishment of a thriving colony of Common Terns.

An anthology of W. H. Hudson.—Is it true, as E. W. Hendy suggested a few years ago, that it has become fashionable to decry the work of W. H. Hudson? If so, then many people have sacrificed the enjoyment of reading the books of one of our most vivid writer-naturalists and have therefore never experienced his uncanny power of communicating his intense joy over birds. The Royal Society for the Protection of Birds, however, has no doubts about Hudson's merit and has done a useful service in publishing an anthology of his descriptive writings under the title *Birds and Green Places* (11s. post free from the R.S.P.B., The Lodge, Sandy, Bedfordshire). The selection has been made by P. E. Brown and P. H. T. Hartley and the book is skilfully illustrated by the indefatigable Robert Gillmor.

Ryves Memorial Prize.—A prize has been instituted by the Cornwall Bird Watching and Preservation Society to commemorate its late founder, Colonel B. H. Ryves. This prize, consisting of books to a value of not more than twenty guineas (to be chosen by the winners), will be awarded each alternate year for original and unpublished work dealing with some aspect of the biology of birds on the current British List. Entrants must be resident in the British Isles and professional zoologists are not eligible. The winning entry, or entries, will be published in the Annual Report of the Society. A leaflet giving full details of this prize, and any other information, can be obtained from the joint secretary, A. G. Parsons, The Bungalow, Trewirgie, Redruth, Cornwall.

Ralph Chislett Memorial Lectures.—Because of the request for no flowers at the funeral of Ralph Chislett, who died last year after decades of service to Yorkshire ornithology (see *Brit. Birds*, 57: 219-220), a number of people expressed a desire to pay tribute to his memory in some other way. It is now proposed to launch a memorial fund to finance a series of lectures to be given in different parts of Yorkshire by eminent naturalists and to be known as the Ralph Chislett Memorial Lectures. Anyone wishing to join in this tribute should write to M. M. Sayer, Hon. Treasurer, Yorkshire Naturalists' Union, 10 The Gardens, Heath Road, Halifax. A full list of subscribers will be published, but not the amounts.

Recent reports

By I. J. Ferguson-Lees

(These are largely unchecked reports, not authenticated records)

This summary is concerned with the two months from late November to late January. It thus follows on after those in the December and January issues (*Brit. Birds*, 57: 523-524; 58: 31-32) and to some extent overlaps with them.

RARE VAGRANTS

The number of rarities was surprising for a winter period. Records of **Glossy Ibis** *Plegadis falcinellus* in Devon and Cornwall—perhaps the same bird and last seen on 31st December—have already been mentioned (58: 32), but another equally unexpected south European species was a **Cattle Egret** *Ardeola ibis* which was captured in a starving condition at Ford (Sussex) on 20th December, having been in the area since the 14th. It is now being nursed back to health in captivity, but enquiries have yet to show whether or not it was an escape in the first place. Switching to birds of arctic origin, the **Snowy Owl** *Nyctea scandiaca* which first appeared in the Isles of Scilly in October (58: 32) was still on Tresco as recently as the end of January,

and another was seen near Lydd (Kent) from 23rd to 31st January. Tresco also produced a **Gyr Falcon** *Falco rusticolus* about 13th January and what may perhaps have been the same one was reported at Marazion Marsh (Cornwall) from 15th January to at least 3rd February. Another northern vagrant was a **Brünnich's Guillemot** *Uria lomvia* which was found alive on the liner *Carinthia* when she docked at Liverpool on 10th January; this bird, an adult female, is now in Liverpool Museum, but unfortunately it is not known where it came on board.

Not only south and north but also west and east were represented. An **American Bittern** *Botaurus lentiginosus* was regrettably shot at Lough Corrib (Co. Galway) on 16th December and another was identified at Blagdon near Newcastle upon Tyne (Northumberland) in late January. No less surprising was a **Pectoral Sandpiper** *Calidris melanotos* which was discovered at Harefield Moor (Hertford/Buckingham border) on 29th December and found dead on 2nd January. More recently, a **Scrub Jay** *Aphelocoma caerulescens* was seen and photographed at Kelynack near St. Just (Cornwall) at the beginning of February, having apparently been in the area for about three months; the difficulty here is that this is a very sedentary species in America and it seems most unlikely that one would have come across the Atlantic even on board a ship, but the question of escapes is being explored.

Pride of place, however, really goes to two observations of Asiatic birds. It will be remembered that two **Eye-browed Thrushes** *Turdus obscurus*—a species never before recorded in the British Isles—were identified in Northamptonshire and the Outer Hebrides in October (57: 524), but they do not make any the less interesting another occurrence of this bird on St. Agnes (Isles of Scilly) on 5th December. Even more remarkable was the identification of a **Pallas's Sandgrouse** *Syrrhaptes paradoxus* at Stodmarsh (Kent) on 28th December. There has been no record of this species in the British Isles since 1909 and, as its periodic irruptions from south-west Asia up to then were caused by food shortage during heavy snow-falls and as subsequent temperature changes and hydro-electric schemes in the Aralo-Caspian region have led to a gradual desiccation of that part, it seemed unlikely that one would ever occur here again unless there were a reversal of this climatic tendency. However, there have been reports of unprecedented snow in the Middle East this winter and it may transpire that the same conditions prevailed further north. It would be interesting to learn if any others were reported on the Continent.

OTHER LESS COMMON SPECIES

Ferruginous Ducks *Aythya nyroca* and **Red-crested Pochards** *Netta rufina* continued to be reported (*cf.* 58: 32), the former at Tring Reservoir (Hertfordshire) on 3rd and 4th January and near Bembridge (Isle of Wight) from 14th December to 7th January and the latter in Kent, Surrey, Northampton, Stafford, Derby and Nottingham. On the other hand, there were few reports of **Little Gulls** *Larus minutus*. A **Spotted Crake** *Porzana porzana* was seen at Stodmarsh on 28th December. An adult male **Rose-coloured Starling** *Sturnus roseus* at Bredhurst (Kent) on 31st December is, like all records of this species and particularly ones out of the migration seasons, open to the suspicion of being an escape. For the sixth winter in succession there have again been a number of **Bearded Tits** *Panurus biarmicus* right away from the breeding areas—in the counties of Lincoln, Cambridge, Huntingdon, Hertford, Northampton, Warwick and Worcester and in three localities in Hampshire and eight places in Kent.

NUMBERS OF WINTER VISITORS

Several of the winter visitors seem to be present in good numbers. One of these is the **Short-eared Owl** *Asio flammeus*, with concentrations of up to ten or more in most counties from Durham to Kent and as many as seven even in Oxfordshire; on

the marshes near Breydon Water (Norfolk) there have been two large diurnal roosts, one in a ruined cottage averaging 35 (but as many as 52 on 27th December and 49 on 24th January) and the other averaging 15 (but as many as 33 on the latter date). In addition, there have been up to 50 on the Ouse Washes and Fulbourne Fen (Cambridgeshire). **Great Grey Shrikes** *Lanius excubitor* have also been unusually numerous: apart from a scattering in east coast counties from Shetland to Kent, odd ones have been seen in Derby, Warwick, Northampton, Cambridge, Buckingham, Hampshire (at least eight) and even as far across as Pembroke, Cheshire and Lancashire (at least five in the last two counties). **Snow Buntings** *Plectrophenax nivalis* and **Lapland Buntings** *Calcarius lapponicus* are widespread and, away from the east coast, the former have been seen in the Midlands and the latter in Cheshire, while **Shore Larks** *Eremophila alpestris* have appeared on the west side in Carmarthen, Pembroke and Flint. Widely scattered reports of **Slavonian Grebes** *Podiceps auritus* have included as many as 20 at two localities in Northumberland in December and no less than 32 on the Exe estuary (Devon) in late November, while the normally scarce **Red-necked Grebe** *P. griseigena* has not only been seen on the east and south-east coasts, but also in Derby, Stafford, Lancashire and the Isles of Scilly. On the other hand, there have been only two or three reports of **Rough-legged Buzzards** *Buteo lagopus*, all in east coast counties; and although a few **Little Auks** *Plautus alle* appeared in November (58: 32), the only ones since then have been small numbers between Shetland and Northumberland in December.

Lastly, **Bewick's Swans** *Cygnus columbianus* are again common. Some arrived in November, including as many as 19 at Eye Brook Reservoir (Leicestershire) on the 28th, and there were small numbers in various parts of the country from Nottingham to Kent in December. Then, just after Christmas, particularly between 29th December and 4th January, there was a big influx. The Ouse Washes are very dry this winter and held only about 25 instead of five to ten times that number. Instead, quite big herds turned up in other places: 30 in Leicester and Nottingham, 45 in Yorkshire and Northampton, up to 70 in Norfolk and up to 100 in Suffolk with smaller numbers in Kent, London, Huntingdon, Derby, Northumberland, Lancashire, Stafford, Warwick, Gloucester and so on.

LATE SUMMER VISITORS

The period also included a number of late summer visitors. **Chiffchaffs** *Phylloscopus collybita* and **Blackcaps** *Sylvia atricapilla* are now recorded in Britain every winter, but **Chiffchaffs** in particular are then usually mainly in the south of England and so it is interesting to note that a total of four was seen in three places in Yorkshire during January; there was also a little spate of **Blackcaps** at the end of November when odd ones appeared in various parts of the country from Yorkshire to Kent and three different individuals were ringed in a garden at Wallingford (Berkshire) on successive days. A few **Swallows** *Hirundo rustica* stayed to the end of November and even into December, while a **Quail** *Coturnix coturnix* was shot at Ryde (Isle of Wight) on 9th December and two others were seen near Hunstanton (Norfolk) up to 3rd January.

These occurrences are less unusual, however, than those involving three other species. A **Swift** *Apus apus* was identified over central London on 26th November (and earlier there was one near Newcastle upon Tyne on 6th November). **Yellow Wagtails** *Motacilla flava* were found at Abingdon (Berkshire) and Bardney (Lincolnshire) on 28th and 29th November respectively; the first of these was ringed on 6th December and the one in Lincolnshire stayed to the remarkable date of 27th December. Finally, and equally extraordinary, two **Common** or **Arctic Terns** *Sterna hirundo* or *macrura* were seen at Minsmere on 13th December and a **Common Tern** was found at Bath (Somerset) on 1st January.

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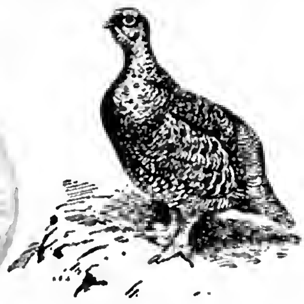

Organo-chlorine residues in some raptor and corvid eggs from northern Britain

By D. A. Ratcliffe
Nature Conservancy

INTRODUCTION

ANALYSIS OF EGGS of the Peregrine *Falco peregrinus* (Ratcliffe in press) and Golden Eagle *Aquila chrysaëtos* (Lockie and Ratcliffe 1964) has shown that these species suffer widespread contamination by organo-chlorine pesticide residues. The Peregrine evidently obtains these chemicals from a considerable range of avian prey, including vegetarian, insectivorous and carnivorous species contaminated through their food, while the Golden Eagle absorbs them largely by feeding on dead sheep which have been dipped in organo-chlorine insecticides.

It therefore seemed likely that other bird-eating raptors, such as the Merlin *F. columbarius*, and other species which take carrion mutton, including raptors such as the Buzzard *Buteo buteo* and corvids such as the Raven *Corvus corax*, would have accumulated the same residues; and egg analysis was adopted as a means of examining the situation. The Kestrel *F. tinnunculus*, said to have declined seriously in parts of lowland England, but still numerous in hill districts, was included in the investigation. Ian Prestt is studying the decline of the Sparrowhawk *Accipiter nisus* and will be preparing a detailed account of its status, including the evidence for pesticidal contamination, so this species is not dealt with here. The Corvidae in general are theoretically susceptible to contamination by these substances and, though they have shown few signs of decline or other chronic ill-effects, there is good reason to believe that widespread deaths of Rooks in some parts of England since 1959 have been due to the effects of organo-chlorine insecticides (Dobbs 1964). It was therefore decided to examine the eggs of a range of crow species—Raven, Carrion Crow *C. corone corone*,

Hooded Crow *C. corone cornix*, Rook *C. frugilegus* and Magpie *Pica pica*—for comparison with those of the raptors.

The areas selected for study were ones for which background data on the breeding populations and food habits of the species concerned were available. This work was carried out under the auspices of the Toxic Chemicals and Wildlife Section of the Nature Conservancy, with the intention of complementing the Section's studies of predatory birds in southern England and Wales. Some of the data have already been published in summary form (Moore and Walker 1964) and some will appear elsewhere in an account of environmental contamination by pesticides (Moore in press).

METHODS

For most species at least one complete clutch of eggs was collected, but other eggs were taken singly from different nests. The nests of several Ravens were revisited to find out if any young were reared from the rest of the clutch. The Raven and Buzzard eggs were all taken from areas where carrion mutton is known to be a principal item in the diet of these species; the Carrion Crow eggs from both upland sheep country and agricultural lowlands; the Rook eggs from two farmland rookeries; and the Merlin, Kestrel and Magpie eggs as available. All but a few of the eggs were collected by me in northern England or southern Scotland, and all were taken under licence. All eggs were analysed by gas-liquid chromatography by the Agricultural Scientific Services of the Department of Agriculture for Scotland (for details see G. Hamilton in Lockie and Ratcliffe 1964: 102). The results are shown in tables 1-4 and will be discussed under the separate species.

BUZZARD

Up to the mid 1950's the breeding population of the Buzzard in the Lakeland area had not only maintained its strength generally, but had even shown local expansion, with pairs nesting in marginal lowland haunts where there had been none before within living memory. In the Pennine part of the area, where Rabbits *Oryctolagus cuniculus* had formerly been an important item of Buzzard diet, there was no appreciable decline immediately after the myxomatosis epidemic of 1954-55. Since 1958, however, there has been a marked decrease in the numbers of Buzzards on the Crossfell range. In the Langdale area of the Lake District, R. J. Birkett has noticed a sharp decline in the Buzzard population within the last few years, but believes that the species has continued to spread in wooded country of the southern Lakeland foothills and lowlands. South of Cockermouth, Ralph Stokoe reports a slight decrease following myxomatosis, though in the Braithwaite area D. Imrie has noticed no fall in numbers.

Concentrations of residue are calculated according to fresh weight, i.e. egg contents without the shell. Figures are correct to the nearest 0.1 parts per million and any value below 0.05 p.p.m. is recorded as 'trace'. Total residues are calculated from actual individual values, so are sometimes more or less than the sum of the figures in the table

	Nest number	Locality	Date	Eggs collected and breeding data	Recent history of territory	ppDDE	ppDDT	Dieldrin	Heptachlor epoxide	BHC isomers	Total residues
BUZZARD	1	Renwick, Cumberland Pennines	27.4	1 from c/2, fresh	c/3, broken later, in 1962; c/4 in 1964	trace	0.1	trace	trace	trace	0.2
	2	Troutbeck, Cumberland	4.5	from c/2, fresh	Regular breeding	0.3	0.1	2.8	trace	trace	3.3
	3	Helvellyn range, Cumberland	4.5	1 from c/2, incubated	Regular breeding	0.4	0.1	4.2	trace	0.1	4.8
	4	Crossfell, Cumberland Pennines	29.5	c/2, deserted and addled	Nest robbed in 1962; no sign of birds in 1964	(*a*) 0.6	–	0.8	trace	trace	1.5
						(*b*) 0.8	–	1.0	trace	trace	1.8
					MEAN	0.4	0.1	2.0	trace	trace	2.5
MERLIN	1	Torver, North Lancashire	May	1 from c/4; nest later destroyed by humans	Regular breeding	3.2	0.1	0.4	0.1	0.1	4.0
	2	*near* Keswick, Cumberland	11.6	1 from c/3, fertile and near hatching	Regular breeding	7.7	0.1	0.4	0.2	0.1	8.4
					MEAN	5.5	0.1	0.4	0.2	0.1	6.2
KESTREL	1	Tweedsmuir, Peeblesshire	15.5	1 from c/4, fresh	Regular breeding	0.1	–	0.1	0.1	0.1	0.4
	2	Lowther Hills, Dumfriesshire	10.5	1 from c/4, fresh	Regular breeding	1.6	–	0.3	trace	0.1	2.0
	3	Moffat Hills, Dumfriesshire	26.5	c/5, slightly incubated and all fertile; lumped for analysis; 4 young reared from repeat laying	Regular breeding	0.6	–	0.2	trace	0.1	0.8
	4	Orkney	June	—	—	0.4	0.1	trace	trace	0.1	0.6
					MEAN	0.7	trace	0.2	trace	0.1	1.0

During the breeding season of 1963 I visited thirteen Buzzard territories which regularly held nesting pairs up to 1960. Five nests with clutches of two eggs each were found and five new but empty nests; in the remaining three territories no nests were found at all, although birds were present. It was not possible to revisit nests from which single eggs were taken, but two young flew from the occupied nest where no egg was taken. In nest 4 (table 1) there were two deserted and addled eggs, though both birds of the pair were about and called a good deal while the nest was being examined. Two of the five empty nests had probably been robbed, as the tree of one had been climbed and the other, on a broken crag, had a stone on it; but there was no proof that eggs had been laid in either. The three other empty nests looked as though they had never held eggs for, while the owners were about all three, none looked finished, though it was past normal laying time. Two of these nests were in trees which had not been climbed, and the third, on a crag, was well littered with down, showing that a Buzzard was brooding upon it.

The pair at nest 1 (table 1) had a clutch of three eggs in April 1962, but the nest was found later to contain only fragments of shell. This is the only case of broken Buzzard eggs I have come across myself, but in 1964 L. MacNally saw a nest with two broken and two deserted eggs near Fort Augustus, Inverness-shire.

The above evidence for local decline in population and breeding success is reminiscent of the Buzzard situation immediately following the myxomatosis epidemic in some southern areas (Moore 1957). But both the Peregrine and the Golden Eagle have shown similar trends and, since in the Buzzards of northern England these symptoms show a closer connection in time with the introduction of dieldrin sheep dips than with myxomatosis, it is more likely that contamination by this substance is the cause. Eggs 2 and 3 (table 1) contained relatively high concentrations of dieldrin, and all five eggs contained measurable amounts of this pesticide, DDE, lindane and heptachlor epoxide. The Buzzard feeds to some small extent on birds and the heptachlor probably came from this source, but dieldrin is likely to have been obtained largely from the carcases of dipped sheep.

Even before the decline of the Rabbit, Buzzards in this region ate a good deal of carrion mutton and they have perhaps relied upon this increasingly in recent years. E. Blezard (unpublished) found sheep remains in 16 out of 43 Buzzard castings, representing nine out of 13 territories, all in the Lakeland faunal area. All the hill-going Buzzards in this region are likely to feed on dead sheep at one time or another, so the species is here very vulnerable to contamination.

There have been no other environmental changes which could conceivably account for a drop in numbers and breeding success of these

Buzzards. The failure of several territory-holding Buzzards to lay eggs in one year is a quite unprecedented event and I have never before found an addled clutch of Buzzard eggs. It therefore seems reasonable to lay the blame for these happenings on organo-chlorine pesticides.

MERLIN

The Merlin is now a local and rather elusive nesting species in the Lakeland faunal area and, according to the views and records of naturalists there, has evidently declined considerably during the present century. From my own observations, numbers appear to have fallen even within the last fifteen years and there are now few areas where one can rely on finding breeding pairs. As the decline seems to have been slow, and spread over a long period, it is not possible to distinguish any recent separate trend corresponding to the sudden fall in the Peregrine population. In part, the decrease in the Merlin population can be attributed to the dwindling extent of heather-clad moorland, as the remaining grouse moors have been abandoned, and heavy sheep grazing has been accompanied by indiscriminate burning; under these conditions heather communities favoured by nesting Merlins are rapidly eliminated and replaced by grassland.

There is more to the story than this, however, for, according to the evidence of local naturalists, the Merlin has decreased markedly in other areas such as parts of the Yorkshire-Lancashire Pennines and northern Wales (Denbigh and Merioneth) where it was quite numerous half a century ago. There is no shortage of suitable habitats in these areas, and Bolam (1913) reported that in Merioneth the species had taken commonly to nesting in Carrion Crow or Magpie nests in trees. Even over much of Scotland the Merlin is now a sparse breeder and in nesting time it seems to be more frequently met with in Orkney and Shetland than anywhere else.

While the finding of moderate amounts of organo-chlorine residues in eggs from two Lakeland Merlin nests (table 1) gives grounds for concern, we cannot therefore justifiably regard pesticides as the main cause of decline, though they may well have been a contributory factor during the last few years. During the breeding season, Merlins in hill country feed mainly on Meadow Pipits *Anthus pratensis*, Skylarks *Alauda arvensis*, Wheatears *Oenanthe oenanthe* and large day-flying insects, and are then less 'at risk' to contamination by pesticides than such species as the Peregrine. During autumn and winter, however, when they leave the hills and range over lowland country, contamination becomes almost inevitable. Some of our Merlins evidently winter on the Continent and these probably absorb pesticides during their travels.

One case of broken eggs in a Merlin nest has come to my notice. This nest, on the coast of Anglesey, originally contained four eggs, but when shown to me by the finder, E. K. Allin, on 17th May 1964, it contained three eggs and the comminuted fragments of the fourth. Mr. Allin told me later that the other eggs disappeared one by one. The incident is an exact parallel to the happenings in numerous Peregrine eyries during recent years.

KESTREL

A widespread decline in breeding populations of the Kestrel has been reported from some of the south-eastern counties of England and attributed to the effects of organo-chlorine pesticides (Cramp 1963; Ian Prestt unpublished). In hill districts of northern England and southern Scotland where I am familiar with this species, there has been no such evidence of a decline. In these districts the numbers of breeding Kestrels show a tendency to fluctuation, year by year, according to changes in populations of the Field Vole *Microtus agrestis*. In the last twenty years these fluctuations have not been large and, though 1957 was a good Kestrel year, there has never been anything approaching the explosion of numbers which occurred during the great vole plagues on the Scottish Borders towards the end of the nineteenth century.

The dependence of hill Kestrels in northern England and southern Scotland on *Microtus* is shown by an analysis of castings from roosts or nesting places by E. Blezard (unpublished). In a total of 90 castings from 14 different territories, 82 contained the fur or bones of this rodent; only three territories showed no *Microtus* in castings, but the samples were so small (one, one and three castings) that its absence from these is hardly meaningful. Beetle elytra were found in 40 castings and in every territory.

Since these hill-going Kestrels feed so largely on voles, other small rodents and such invertebrates as beetles, there would seem to be less chance of their becoming contaminated by pesticide residues, for their prey lives in an environment relatively free of pesticides, apart from sheep dips. There is more chance of Kestrels taking contaminated prey during winter if, like Merlins, they desert the hills for the lowlands. Many hill Kestrels appear to cling to their nesting haunts through the winter, though there is a tendency for them to hunt more about the agricultural and marginal land of the fell-foot, especially during hard weather; they are then more likely to pick up residues.

Four eggs were analysed, all from nests in hill country but within a mile or two of upland farms with some cultivated ground. They contained rather small residues, as might be expected from the foregoing remarks. No eggs from lowland agricultural country have been

examined and, since contamination could be expected to be much higher in such areas, the data in table 1 are not to be regarded as invalidating the claim that pesticides are responsible for the widespread decline of the Kestrel in south-eastern England. Rather do they support this claim by showing that, while several Kestrels from the depleted populations of southern farmland have been found dead with quite large residues (N. W. Moore unpublished; Cramp, Conder and Ash 1964), the eggs from undiminished populations in northern areas contain low residues. The annual output of young Kestrels from the uplands of Britain must be considerable and, if wastage rate were not so high in the south-eastern counties, might be sufficient to restore breeding populations in the depleted areas. A recent decline in agricultural areas is not universal, however, and in the lowlands around Carlisle the Kestrel has always been a sparse nester during the last two decades.

RAVEN

Perhaps even more than the Buzzard and the Golden Eagle, the Raven of the uplands depends to a large extent on dead sheep for food. Coastal or woodland nesting Ravens may have to forego this item, but at hill breeding haunts in northern England and southern Scotland it is usual to find sheep's wool in Raven castings at any time of the year. In an analysis of 100 Raven castings collected during nesting time in these two regions, E. Blezard (unpublished) found that 59 contained sheep's wool, this item being by far the most important of the identified remains. These castings were from 16 different Raven territories, in only two of which was no sheep's wool found, though in these two the samples (of one and three castings) were so small that it was probably missed purely by chance. It is therefore clear that Ravens living in upland sheep country must be exposed to the hazard of organo-chlorine contamination from the fleece, skin and flesh of sheep treated with these substances (mainly DDT, BHC and dieldrin), which are now widely used in dips.

While there is no evidence of a general decline in either numbers or breeding success of Raven populations in districts I have studied (mainly inland parts of northern Wales, northern England, southern Scotland and the Highlands), a number of scattered incidents noted only during the last few years suggest that the species may not be exempt from harm. In 1958 and 1961 two female Ravens were found dead at nests in Cumberland and Dumfriesshire. Poisoning was indicated, but analysis of the first bird showed no trace of conventional poisons; the tissues were not examined for organo-chlorine compounds, which only later came under suspicion. The second bird was not analysed chemically, but did not show symptoms of strychnine

Table 2. Analyses for organo-chlorine residues in eggs of Raven *Corvus corax* from northern England and southern Scotland in 1963

See notes at the head of table 1

Nest number	Locality	Date	Eggs collected and breeding data	Recent history of territory	ppDDE	ppDDT	Dieldrin	Heptachlor epoxide	BHC isomers	Total residues
1	Helvellyn range, Cumberland	19.3	1 from c/6, fresh; nest fell or was pulled down; hatched 4 young in repeat	Regular breeding; same ♀ present in 1959	0.2	–	0.7	trace	0.6	1.5
2	*near* Caldbeck, Cumberland	20.3	1 from c/4, incubated; young reared from remainder	Regular breeding	0.1	trace	0.6	trace	0.1	0.9
3	*near* Keswick, Cumberland	19.3	1 from c/6, incubated; 2 young reared	Regular breeding	0.2	–	0.3	trace	0.2	0.8
4	*near* Coniston, north Lancashire	26.3	1 from c/6, incubated; not revisited	Regular breeding	0.3	–	1.3	trace	0.3	1.8
5	*near* Carsphairn, Kirkcudbrightshire	24.3	1 from c/5, incubated; 2 young reared	Regular breeding; hatched in 1964 but young vanished	2.6	0.7	1.5	trace	0.3	5.1
6	Moffat Hills, Dumfriesshire	23.3	1 from c/4, incubated; young reared from remainder	Regular breeding	0.6	0.1	1.3	trace	0.2	2.3
7	Moffat Hills, Dumfriesshire	23.3	1 from c/5, fresh	Regular breeding; ♀ found dead at nest in 1961 (see page 00)	(*a*) 2.1	–	1.0	trace	0.2	3.3
		11.4	1 addled egg; nest had 1 young and 2 chipping eggs besides; young reared		(*b*) 1.5	–	0.8	trace	0.1	2.4
8	Moffat Hills, Dumfriesshire	11.4	2 out of 4 addled eggs with 1 youngster, which was reared	Regular breeding	(*a*) 1.0	trace	0.2	0.1	0.3	1.6
					(*b*) 0.9	trace	0.3	0.1	0.3	1.6
				MEAN	1.0	0.1	0.8	trace	0.3	2.1

of phosphorus poisoning. In any case, neither bird was from keepered areas where poison is put down for 'vermin'. In 1961 G. Trafford found two broods of young Ravens dead in their nests in Galloway, and in 1963 an eyrie in Dumfriesshire (nest 8 in table 2) contained a single youngster and four bad eggs, an unusually large number to be found addled.

Some local declines in Raven populations, where toxic chemicals have been suspected, have other causes. One area of the Southern Uplands, in Kirkcudbrightshire, has experienced a marked decline over the last 10-15 years. Formerly, at least seven pairs of Ravens bred regularly in this massif, but in 1964 there was only one pair, all the other territories being apparently deserted. In part, this decline has been associated with the return of the Golden Eagle as a nesting species, for Ravens have ceased to breed within eagle territories, even though some of them stay around during the nesting time. Cliffs where eagles settle to nest are deserted at once by Ravens, but alternative cliffs may continue to be used by Ravens when eagles are not in residence there. In this area, however, not only alternatives but also cliffs never used by eagles have been deserted too, and the large-scale afforestation of the area by the Forestry Commission has also contributed to the decline. Over many square miles where sheep once roamed in large numbers there is now a blanket of conifers. Removal of the sheep stocks deprived the Ravens of their most important source of food and, since the forests have not provided alternative resources, it is hardly to be wondered that the species has lost ground. Similarly, in Lakeland the desertion of a Raven territory in upper Ennerdale can be attributed to afforestation and removal of sheep.

There is thus no reason to suspect that use of organo-chlorine pesticides in sheep dips has seriously affected the status of the Raven or that it constitutes a definite threat, though local breeding failure might be thus explained. The analysis of eggs from eight Raven eyries, all in sheep country of Lakeland and the Southern Uplands, shows that contamination of the species by DDT, BHC and dieldrin is general (table 2). There is, in fact, a close resemblance, both in level of contamination and proportions between different residues, to the situation in the Golden Eagle and the Buzzard. But breeding success from this random sample of population was good; six of the eight pairs reared at least one youngster, another hatched a repeat clutch after being robbed, and the last was not revisited. Nest 8 (table 2) was, however, the one with a single youngster and four bad eggs. Two of these eggs were lost, but the two which were analysed did not contain large residues. Loss of fertility might have been due to heavier contamination of the male bird, and this would not show in the eggs. Nest 1 (table 2) was situated on the same crags as Buzzard nest 3 (table 1), but

the residues in the Raven egg were only about one third of those in the Buzzard egg. The element of chance in feeding habits could explain such differences, and it would seem that the mean level of contamination is similar for the two species. Yet the Raven population has been less affected than that of the Buzzard.

CARRION CROW

The Carrion Crow is a common nesting bird over much of Britain south of the Highlands, and in the areas where I know it best, in northern England and southern Scotland, there is no sign of decline in either breeding population or breeding success. Eggs were taken at random from a lowland population, mainly in the Solway area of Cumberland, and from upland haunts in the Cumberland Pennines and central Southern Uplands. The lowland crows eat a good deal of grain and other vegetable matter from farmland, besides numerous invertebrates, small vertebrates, birds' eggs and all manner of carrion. In an examination of the gut contents of twelve Carrion Crows, all but one shot between October and March around Carlisle, Cumberland, E. Blezard (unpublished) found that eleven contained seed oats while the twelfth was crammed with locust bean. One bird obtained in June contained sprouting oats, and castings at winter roosts are often composed largely of oat glumes. The Carrion Crow is thus susceptible to a primary source of contamination—dressed grain—though poisoning from this source has decreased since 1961 (see page 80). Upland crows feed about the hill farms and marginal land, but probably receive less contamination from the vegetable component of their diet than do the lowlanders. This deficit is probably more than made up by their feeding on dead sheep to some extent, and the upland nests in table 3 were all in hill territories where carrion mutton is likely to be eaten by the crows.

It is interesting to note that, while residues are generally lower than in the Raven, those in hill crow eggs are somewhat higher than in lowland crow eggs. The difference is likely to be due to the eating of sheep carrion by hill birds.

Table 3 shows that in five clutches there was remarkably little variation in residue content between eggs of the same clutch, demonstrating that, in general, analysis of any egg from a clutch will give a representative value for that clutch. This is not invariably the case in raptors, which have a longer laying period (Ratcliffe in press).

HOODED CROW

Although the southern distribution limits of the Hooded Crow in the Highlands seem to be retreating northwards, this is associated with a spread of the Carrion Crow; there is no fall in numbers or breeding

	Nest number	Locality	Date	Eggs collected and breeding data	ppDDE	ppDDT	Dieldrin	Heptachlor epoxide	BHC isomers	Total residues
AGRICULTURAL LOWLANDS	1	Kirkbride, Cumberland	20.4	c/4, fresh	(*a*) 0.5	0.1	0.1	trace	0.1	0.7
					(*b*) 0.4	trace	0.1	trace	trace	0.5
					(*c*) 0.3	trace	trace	trace	trace	0.4
					(*d*) 0.3	trace	trace	trace	trace	0.4
	2	Glasson, near Carlisle, Cumberland	6.5	c/2, fresh	(*a*) 0.7	0.2	0.2	0.1	0.1	1.3
					(*b*) 0.9	0.2	0.3	0.1	0.1	1.5
	3	Biglands, near Wigton, Cumberland	6.5	1 from c/4	0.5	–	trace	trace	trace	0.5
	4	*near* Carlisle, Cumberland	6.5	1 from c/4, embryo	0.1	–	trace	–	trace	0.2
	5	*near* Carlisle, Cumberland	6.5	1 from c/4, embryo	0.2	–	0.1	trace	0.1	0.4
	6	*near* Carlisle, Cumberland	6.5	1 from c/3, embryo	0.2	0.1	trace	trace	0.1	0.4
	7	*near* Carlisle, Cumberland	6.5	1 from c/3	0.1	trace	trace	trace	0.1	0.2
	8	*near* Airdrie, Lanarkshire		Addled	0.2	0.2	0.1	0.2	0.3	0.8
				MEAN	0.3	0.1	0.1	trace	0.1	0.6
UPLAND SHEEP-WALKS	9	Renwick, Cumberland Pennines	27.4	c/4, fresh	(*a*) 0.1	trace	0.1	trace	0.1	0.3
					(*b*) 0.1	trace	0.1	trace	0.1	0.3
					(*c*) 0.1	trace	0.1	trace	0.1	0.3
					(*d*) 0.1	trace	0.1	trace	0.1	0.3
	10	Renwick, Cumberland Pennines	27.4	2 from c/4, fresh	(*a*) 0.1	–	0.1	trace	trace	0.2
					(*b*) 0.1	trace	0.1	trace	0.1	0.2
	11	*near* Langholm, Dumfriesshire	11.5	c/4, incubated	(*a*) 0.5	–	0.3	trace	0.1	0.9
					(*b*) 0.5	–	0.4	trace	0.1	1.0
					(*c*) 0.5	–	0.4	trace	0.1	1.0
					(*d*) 0.6	–	0.4	trace	0.1	1.0
	12	Tweedsmuir, Peeblesshire	15.5	1 from c/4, embryo	0.6	0.1	0.6	0.6	0.2	2.1
	13	Moffat Hills, Dumfriesshire	26.5	c/1, fresh	0.9	–	0.1	trace	0.1	1.1
	14	Kirkland, Cumberland Pennines	29.5	1 addled egg; nest had 2 young besides	0.3	0.1	0.2	trace	0.1	0.6
				MEAN	0.4	trace	0.3	0.1	0.1	0.9

success over its main range. Many Hooded Crows live in deer forests where there are few or no sheep and perhaps the densest populations are along the western coasts, where much of their foraging is done along the shoreline. The diet of the Hoodie is very similar otherwise to that of the Carrion Crow and a good deal of sheep carrion is eaten. The only egg obtained was from a crofting area in Wester Ross, and the residues were rather low (table 4), but within the range for the Carrion Crow.

ROOK

Though I have not made a careful study of the Rook situation, there has been no obvious decline in numbers at the Cumberland rookeries known to me, but, as already noted, a marked decrease in the Rook population of Nottinghamshire between 1958 and 1962 has been reported (Dobbs 1964). One Cumberland rookery of several hundred pairs, which I have followed for ten years, has increased slightly in size during this time. A selection of eggs was taken at random here and from another rookery several miles away. Both are situated amongst arable land where oats, root crops and hay are the main produce, though there is a fair extent of permanent pasture besides. Rooks in these areas feed largely on vegetable matter (including grain) and invertebrates (including earthworms) which they obtain almost entirely from farmland. Three out of four dead Rooks examined by E. Blezard (unpublished) from near Carlisle contained oats, and castings in rookeries in this area are usually packed with oat glumes during March and April.

The residues found in eggs from both rookeries were rather low and fell within a narrow range (table 4). Only one egg had a total organochlorine residue content above 1.0 parts per million. Even so, the contamination levels are considerably higher than those reported by Taylor and Brady (1964) who found a series of Rook eggs from cereal growing areas of Cambridgeshire and Essex to be virtually pesticide-free, a most surprising result.

MAGPIE

No information is available about the present status of the Magpie in Britain generally, but in the Solway area of Cumberland it has certainly shown no decline—rather has it increased—during the last twenty years. Magpies in this area are quite common and share the same nesting haunts as Carrion Crows and Rooks, so that their diet overlaps to some extent. Like the Carrion Crow and Rooks, Magpies in this area take a good deal of seed oats (E. Blezard). Eggs were collected from three nests in farmland with about equal areas of pasture and arable land, and residues were similar to those in lowland Carrion Crows and Rooks (table 4).

Table 4. Analyses for organo-chlorine residues in eggs of Rook *Corvus frugilegus*, Magpie *Pica pica* and Hooded Crow *Corvus corone cornix* from northern England and Scotland in 1963

See notes at the head of table 1

	Nest number	Locality	Date	Eggs collected and breeding data	ppDDE	ppDDT	Dieldrin	Heptachlor expoide	BHC isomers	Total residues
HOODED CROW	1	Opinan, near Laide, Wester Ross	20.4	1 from c/5, fresh	0.4	trace	0.1	trace	0.1	0.6
ROOK	1	High Hesket, Cumberland	27.3	1 from c/5	trace	–	0.1	trace	0.1	0.2
	2	High Hesket, Cumberland	27.3	1 from c/5	0.1	0.8	0.1	trace	0.1	1.2
	3	High Hesket, Cumberland	27.3	1 from c/4	trace	–	trace	trace	0.1	0.2
	4	High Hesket, Cumberland	27.3	2 from c/5	(*a*) 0.1	trace	0.1	trace	trace	0.2
					(*b*) 0.1	0.1	0.1	–	0.1	0.3
	5	High Hesket, Cumberland	27.3	c/1	trace	–	trace	–	0.1	0.2
	6	High Hesket, Cumberland	27.3	1 from c/5	0.1	trace	0.1	trace	trace	0.2
	7	High Hesket, Cumberland	27.3	1 from c/5	trace	trace	0.4	trace	0.1	0.5
	8	Calthwaite, Cumberland	27.3	c/1, fresh	0.1	trace	0.2	trace	0.1	0.4
	9	Calthwaite, Cumberland	27.3	1 from c/4	0.1	trace	0.2	trace	0.2	0.5
	10	Calthwaite, Cumberland	27.3	1 from c/4	0.1	trace	0.2	trace	0.1	0.4
				MEAN	0.1	0.1	0.2	trace	0.1	0.4
MAGPIE	1	Biglands, near Kirkbride, Cumberland	6.5	2 from c/6; lumped for analysis	0.4	–	0.2	trace	trace	0.6
	2	*near* Carlisle, Cumberland	6.5	c/8; lumped for analysis	trace	–	trace	trace	trace	0.1
	3	Glasson, near Kirkbride, Cumberland	8.6	1 from c/3, fresh	0.2	–	0.1	–	0.1	0.4
				MEAN	0.2	–	0.1	trace	trace	0.4

CONCLUSIONS

Of the 61 eggs analysed, from 46 different nests, not one was free from organo-chlorine residues. The results for the regions studied thus lend support to the idea that contamination of the environment and associated bird populations is general in Great Britain (Moore in press). The species represent a fairly wide range of upland and lowland habitats, but it is noticeable that the raptors as a whole were more heavily contaminated than the corvids. Mean figures for the total organo-chlorine residues in parts per million (p.p.m.) found in the eggs of these various species, including ones reported elsewhere (Lockie and Ratcliffe 1964, Ratcliffe in press) are as follows, the figures in parentheses being the numbers of nests from which eggs were analysed:

RAPTORS		CORVIDS	
Peregrine (13)	13.8	Raven (8)	2.1
Merlin (2)	6.2	Carrion Crow (14)	0.8
Golden Eagle (7)	2.6	Hooded Crow (1)	0.6
Buzzard (4)	2.5	Rook (10)	0.4
Kestrel (4)	1.0	Magpie (3)	0.4
Mean	5.2	Mean	0.9

This accords with the general observation that the raptors have suffered a decline in numbers and breeding success during recent years, while the corvids have been virtually unaffected. More specifically, the Peregrine has been most affected and only in a few northern districts has its breeding population escaped depletion; the Kestrel has decreased over the south-eastern parts of its range; and the Buzzard has undergone local decline. Breeding success of both the Golden Eagle and the Buzzard has dropped markedly in areas where these species eat much sheep carrion, and in the Peregrine it has declined almost everywhere (Ratcliffe 1963). The Kestrel has not decreased in hill country where it is less in contact with pesticides; and the decline of the Merlin may be a long term trend not initiated by pesticides, though quite possibly exaggerated by them.

Among the corvids, only the Raven shows any signs of similar disturbance and this agrees with the finding that it, alone of its family, shows contamination approaching that of the raptors. All the other corvids, although often living in agricultural lands where they are highly susceptible to contamination and where the Sparrowhawk and, to a lesser degree, the Kestrel have declined severely, have only rather small amounts of pesticide residue in their eggs. This difference in contamination between raptors and corvids is presumably due to differences in their food or physiology, or both. In being partly vegetarian, the corvids are feeding on a primary source of contamina-

tion; in other words, they form the first link in a food chain. Carson (1962) has quoted examples to show that level of organo-chlorine contamination increases at each link in passing up a food chain, so the species at the top may contain considerable quantities while organisms at the bottom have very little. Drawing data from lowland bird populations, Moore and Walker (1964) have shown clearly that carnivorous species become much more heavily contaminated by these substances than do vegetarians.

In a series of sea-bird eggs which I collected on 27th May 1963 on St. Abb's Head, Berwickshire, those of Kittiwakes *Rissa tridactyla*, which are plankton feeders, contained the lowest residues with a mean of 0.3 p.p.m.; Herring Gulls *Larus argentatus*, which are omnivores, came next with 0.9 p.p.m.; then auks (Guillemots *Uria aalge*, Razorbills *Alca torda* and Puffins *Fratercula arctica*), which are small fish eaters, with 3.5 p.p.m.; and Shags *Phalacrocorax aristotelis*, which are large fish eaters, were top of the list with 7.8 p.p.m. (Moore and Tatton in press). This illustrates the same trend. It is perhaps significant that the Raven, which is the most carnivorous of the corvids, is the most contaminated of its family; and that the Carrion Crow, which feeds on dead sheep, shows rather higher residues than the remaining species, which do not.

It may well be that the corvids other than the Raven are, in effect, feeding on a less contaminated diet than the raptors. Perhaps, if both were fed artificially on diets containing the same amounts of pesticide, the difference would disappear. On the other hand, it is possible that the corvids may be more efficient at metabolising and excreting organo-chlorine residues than are the raptors, so that they store less in their tissues.

These questions must remain unanswered until experimental evidence is available. We do not even know whether the relationship between the amount of residue in eggs and that in various organs of the birds themselves is more or less constant, either within a species or between different species and families. It has been assumed in this paper that residues in eggs give a qualitative indication of level of contamination in the bird which laid them. But in view of the finding that the Raven suffers almost the same degree of contamination as the Golden Eagle and the Buzzard, but without comparable ill-effects on breeding success, it seems possible that physiological differences may render it less sensitive to these poisons than the raptors. There is already a good deal of experimental evidence to show that even related species of birds—for example, the Bob-white Quail *Colinus virginianus* and the Pheasant *Phasianus colchicus*—differ a good deal in their sensitivity to such pesticides as DDT and dieldrin (Rudd and Genelly 1956). However, in the Raven, as in other corvids, there is a lower ratio of

dieldrin to DDT (and its metabolites) than in the Golden Eagle and the Buzzard, which might mean that it is on average effectively less contaminated than these raptors. Whether or not corvids as a whole are more resistant than raptors in agricultural country, such pest species as the Carrion Crow certainly appear at present to have an advantage over the Kestrel and the Sparrowhawk. Whatever the reasons for the difference, the corvids examined seem to flourish under the present chemical regime, whereas the position of all the raptors gives grounds for anxiety.

It should be emphasised that all the eggs examined and discussed in this paper were taken in 1963. In late 1961 the use of aldrin, dieldrin and heptachlor as cereal seed-dressings came under a voluntary ban (partial in autumn, complete in spring). The result, in 1962 and 1963, was a considerable reduction in major kills in farming areas (Cramp, Conder and Ash 1964). At the end of 1964 a more general voluntary restriction on these pesticides (including their use in horticulture) came into force. The position of grain-feeding birds, and of predator species which feed on them, thus holds hope of improvement. A ban on the use of dieldrin in sheep-dips is intended to operate from the end of 1965, but reports of stock-piling of this chemical by sheep-farmers are so widespread that no early improvement can be expected regarding the contamination of birds which feed on sheep carrion.

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SUMMARY

Analysis of eggs suggests that there is general contamination of the populations of the Buzzard *Buteo buteo*, Merlin *Falco columbarius*, Kestrel *F. tinnunculus*, Raven *Corvus corax*, Carrion Crow *Corvus c. corone*, Rook *C. frugilegus* and Magpie *Pica pica* in northern England and southern Scotland by residues of DDT, dieldrin, heptachlor and BHC. Levels of contamination are, on average, higher in the raptors than in the corvids.

In the Lakeland faunal area, a recent local decline in the breeding population and breeding success of Buzzards is probably due to these substances as used in sheep dips and obtained from carrion. Merlins have declined in northern England, but, while this trend may have been aggravated by pesticides, its origins seem to pre-date the widespread use of organo-chlorine insecticides. Hill Kestrel populations in these regions are unaffected, and their eggs show low residues, for here the species has little contact with these substances. Ravens have shown symptoms, such as deaths of adults and nesting failures, which could justifiably be attributed to organo-chlorine residues, but there has been no general indication of adverse effects on their populations. Carrion Crows, Rooks and Magpies have shown no reduction in numbers or breeding success in this part of Britain, and residues in these species are generally small. Of the corvids studied, only the Raven shows levels of contamination approaching those of some raptors.

The data support the hypothesis that carnivorous bird species accumulate much larger organo-chlorine residues than those which depend more on vegetable food. The Raven qualifies as a carnivore in these regions from its dependence on sheep carrion, in contrast to the other corvids which eat a great deal of grain.

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The New Dictionary

Special Review by Joseph J. Hickey

A New Dictionary of Birds. Edited by Sir A. Landsborough Thomson. Nelson, London, 1964. 928 pages; 16 coloured and 48 monochrome plates. £5 5s.

'SOME BOOKS', we were all told long ago, 'are to be tasted, others to be swallowed, and some few to be chewed and digested'. *A New Dictionary of Birds* is clearly not something that a reader will swallow whole. For those with intellectual tastes, I can report, it is written in digestible prose; and for readers with an avid appetite, it has scores of delectable nuggets to feed the mind.

The book is an excellent compendium of current, world-wide, ornithological knowledge together with some cultural asides on Fabulous Birds, Folklore, Birds as Omens, Heraldic Birds, Shakespeare's Birds and the like. Most of the definitions are short, but the strength of the book lies in its major articles on 243 general subjects and 184 taxonomic groups of birds. Among the former are 71 essays on form and function, 34 on systematics and evolution, 39 on distribution and ecology, 51 on behaviour and ethology, 12 on general topics and 36 on subjects involving birds and man. These major articles are written by 173 contributors and illustrated by eight artists and thirty photographers. Although the contributors and illustrators are said to represent 27 different countries, most of the articles on general subjects are written by authors in the United Kingdom. Initially conceived as one of three special enterprises marking the Centenary of the British Ornithologists' Union, the book is a fitting monument to the vigour of the B.O.U. and a worthy tribute to Professor Alfred Newton, F.R.S., whose classic *A Dictionary of Birds* has served ornithologists throughout the world since 1896 and inspired publication of this new work.

The *New Dictionary* is a wholly new book intended mostly for general readers, and—to a lesser extent—for ornithologists and for other scientists wishing to draw upon the subject matter of ornithology outside the areas of their particular competence. It contains 'background information' on such subjects as climatology (6½ pages), genetics (4 pages), meteorology (8½ pages) and statistical methods (4 pages). It also contains articles on Classification, International Congresses, Census, Counting, Hybridisation, Radar, Tameness, Toxic Chemicals, Scaring and many other subjects. About the only thing missing is any summary of hints on how to cook a duck—a subject perhaps too barbarous for the ornithologist's notice or else

requiring a book in itself. (There are, however, at least four cross references in the book to an article on Gastronomic and Medical Uses; but I failed to locate this essay.) The somewhat overwhelming scholarship and footnote material in Newton's volume are here sensibly replaced by restricted bibliographies that are likely to lead the reader to much fuller treatments and wider arrays of the technical literature.

To write a critical review of such a book would tax the talents of a Newton or an Erwin Stresemann, and it might well require the aggregate thinking of a whole team of ornithologists. The list of contributors in *A New Dictionary* reads like a *Who's Who* of world ornithology, and errors of commission in such a carefully edited work are unlikely. Sins of omission are bound to occur to readers with different backgrounds and needs, but editorial decisions on the length of potential contributions in a work of this sort must be difficult and inexorable; and the writers' tasks of condensing under editorial pressure are often even more painful and frustrating. The present volume is obviously the product of much editorial thought. Its system of cross-references is extensive, complicated and generally adequate; and the prose is not jerky as the reader passes from one contribution to another.

It is, I suppose, incumbent on every reviewer of this book to reflect on the differences between *A New Dictionary* and the old classic of 1896. There are four that occur to me, and—as much as anything—they reflect the old ornithology and the new.

To begin with, Newton's wonderful prose has, of course, no counterpart in the present volume. Like his great contemporary, Elliott Coues, Newton wrote with the grace of Arnold, Carlyle and Ruskin. Both he and Coues gave to the literature of nineteenth-century ornithology a literary flavour and distinction that we are seldom to see again. Some of their lustre is reflected in the more recent books of Eliot Howard and R. M. Lockley, but the mushrooming of scientific knowledge seems to have left no place for truly graceful writing. *A New Dictionary* has the terse and spartan prose typical of our time. It is clean, and it does the job of communication well.

The new book is also a worthy example of contemporary achievements in the graphic arts in the Western World; and a comparison here with Newton's volume is almost painful to contemplate. For his book, Newton borrowed electrotypes of cuts used in books by William Swainson, Sir Walter Buller and others. Aside from the anatomical drawings, which surely are quite adequate even today, the illustrations in this old work scarcely compare to those used in Sir Landsborough Thomson's new book, 15 of which are full-page colour plates drawn by eight artists to illustrate types of plumage, evolu-

tionary radiation, egg coloration, etc. These are generally of a high quality (but something—perhaps the ink—went wrong on plate 20 in my copy: I cannot even recognize the North American Screech Owls). The two colour and 48 plates of black-and-white photographs are of an exceptionally high quality too (Allan D. Cruickshank's fine picture of North America's 'Common Crow' standing on top of a huge fish happens to be that of a Fish Crow; but no one is apt to detect this unless he has seen the same picture correctly labelled in Cruickshank's *Birds around New York City*). Although competently selected for the biological information they convey, several of these half-tones are quite memorable: an alarmed bittern by Loke Wan Tho, a Night Heron by Christina Loke, a Wrybill by M. F. Soper, a Sanderling by G. S. Smith. Set on heavier-stock paper than that used for the rest of the book, the pictures are inserted with no relation to the adjacent text, a circumstance dictated of course by modern binderies and not by editors. To some extent, this inevitably detracts from the value of the book to the casual reader, but in a curious fashion the pictures tempt one to browse, and they do delight the eye.

The other differences are more important. The scholarly footnote approach of Newton is completely abandoned in the present work. So too is his abundance of detail. While footnotes do increase the printing costs today, Newton's book seems in retrospect to be almost written for the professional reader; Thomson's is certainly directed toward the amateur ornithologist, and the breadth of ornithology today scarcely permits much detail even in a book of 928 pages.

It is this breadth of subject matter that constitutes the greatest difference between these two great bird books. *A New Dictionary* is replete with facts and ideas unknown in 1896. There are terms like ritualisation, bird-watching, population dynamics, moon-watching and colour specification that were unknown to Newton—and even such words as radar, ecology and imprinting that had not yet entered our language.

These differences will interest the scholar. Potential readers will want to know: is the book good? It is. Very, very good. It has the stamp of authority, and it is a delight to read special articles by the acknowledged experts in different areas: Dr. R. A. Hinde on Display, Courtship Feeding, Nest Building and Pair Formation; Dr. W. H. Thorpe on Imprinting, Learning, Vocal Mimicry and Singing; Dr. N. Tinbergen on Territory, Sign Stimulus, Recognition and Releaser—to mention just a few. I was especially impressed by James Fisher's article on Extinct Birds.

Superimposed on all this are one's impressions that the scope and organisation of this book has been superbly thought out and that its editorial execution has been completed with extreme care. As a

PLATE 13. Male Montagu's Harrier (*Circus pygargus*) in flight, Norfolk (Walter E. Higham)
(pages 85-86)

PLATES 14 and 15. Above, Black-winged Stilt *Himantopus himantopus* nearing nest, France. Below, Partridge *Perdix perdix* and eggs, Norfolk. Opposite, pair of Sand Martins *Riparia riparia* together at nest-hole, Yorkshire (*Walter E. Higham*)

PLATE 16. Sparrowhawk *Accipiter nisus* at nest with young, Norfolk (*Walter E. Higham*)

PLATE 17. Golden Eagle *Aquila chrysaetos* with prey at eyrie, Moray. [illegible]

PLATES 18 and 19. Opposite, Kingfisher (*Alcedo atthis*) perching with prey, Yorkshire. Above, Barn Owl (*Tyto alba*) and three downy nestlings, Norfolk. Below, Short-eared Owl (*Asio flammeus*) on nest with vole in bill, Norfolk. *Walter E. Higham*

PLATE 20[illegible]. Ringed Plover (*Charadrius hiaticula*) and eggs, Lancashire (*Walter E. Higham*)

reference tool for those interested in virtually every aspect of bird life, it will be useful for many decades to come. As their centennial enterprise, members of the British Ornithologists' Union can regard the result with much satisfaction. When the review copies finally reach that great Valhalla where even the precise ancestors of *Archaeopteryx* and *Hesperornis* are known to all resident ornithologists, Alfred Newton, a founder of the B.O.U., will, I am sure, be proud and delighted.

British bird-photographers
4. Walter E. Higham

(Plates 13-20)

EVERY DECADE seems to produce one outstanding bird-photographer and there can be no doubt that from the mid-1920's Walter Higham was in a class on his own. He was born at St. Anne's-on-Sea, Lancashire, in 1900 and began to dabble in photography on being given a box camera for his sixth birthday. An equally early interest in natural history tended more towards entomology, but when he was thirteen his parents moved to an old house with a large and partly wooded garden right out in the country and the greater variety of birds there made him turn his attention to ornithology. This new interest was fostered at his public school, Mill Hill, where he came under the influence of the late A. J. Rooker Roberts; there, too, he was appointed curator of the school photographic society's darkroom and, although he terms this 'a dubious privilege', it gave him a good groundwork in the technical side of photography.

Even so, his two hobbies might never have developed beyond that stage if chance had not taken a hand. At the age of seventeen he had the misfortune to lose an eye as a result of a shooting accident and, finding it difficult to play football and cricket, he devoted still more time to photography and birds. He began to take an interest in filming and this in turn led to his decision to become a full-time bird-photographer. His Lancashire home being within easy reach of the moors, he was never at a loss for subjects and one of his earliest successes was a series of portraits of a Curlew *Numenius arquata* at the nest.

He has photographed in many parts of Britain, but the Norfolk Broads fascinated him most and he went there season after season. Three of the pictures in this selection belong to that period. The Sparrowhawk *Accipiter nisus* (plate 16) has all the qualities of a really successful bird-photograph: sharp focus on the bird and nest and a

subdued background which does not take the eye away from the main subject. The Short-eared Owl *Asio flammeus* with a vole in its bill (plate 19b) illustrates the remarkable definition achieved by Higham, always the perfectionist with a thorough understanding of good apparatus, in getting better results with a 16-inch telephoto than most people could secure with a lens of much shorter focal length. He was the first to photograph harriers successfully in flight and the male Montagu's Harrier *Circus pygargus* (plate 13), taken with a half-plate camera which, at $6\frac{1}{2}$ inches by $4\frac{3}{4}$ inches, is very much more awkward to use on flying birds than the modern 35 mm. equipment, is just one of a series he obtained as long ago as 1931; many others may be seen in his book *Birds in Camera* (1949).

The pair of Sand Martins *Riparia riparia* (plate 15) make a particularly delightful study, as do the Kingfisher *Alcedo atthis* with prey (plate 18) and the family group of Barn Owls *Tyto alba* (plate 19a), while the Ringed Plover *Charadrius hiaticula* (plate 20) is another fine example of Higham's outstanding technique: here, to cover the depth of field, he used a swing-back—a device which is a good servant if skilfully handled, but one which can easily develop into a bad master. The Partridge *Perdix perdix* (plate 14b) is notoriously difficult to photograph and there are still few pictures to match this one, showing not only the nest and eggs but even the scales on the bird's feet. In this series we have already reproduced photographs of the Golden Eagle *Aquila chrysaëtos* by Seton Gordon and Harold R. Lowes, but we still must include Higham's magnificent picture of one nesting in a tree (plate 17).

Although most of Higham's work has been done in this country, he is equally well known for the pictures he took in Hungary and France. There is room for only one of these in this selection—the Black-winged Stilt *Himantopus himantopus* approaching its nest in the Camargue (plate 14a), a study which gives a vivid impression of bird, nest and habitat in one.

Although it does not concern us so much here, it should be remembered that as soon as colour photography came on the scene Higham tried it out with enormous success. His *Birds in Colour* (1946) was the first bird-book in this country to be illustrated entirely with colour photographs. Higham's early interest in the cine-camera developed with equal skill: he was using 35 mm. monochrome film more than 40 years ago and later turned to colour until ill-health forced him to give up photography some ten years ago. He was twice awarded the Medal of the Royal Photographic Society, for a series of harrier photographs in 1928 and for a bird film in 1930; he was elected a Fellow of the Society in 1929 and of the Institute of British Photographers in 1944.

E.H.

Summary of foreign-ringed birds in Britain and Ireland during 1906-63*

By Robert Hudson

British Trust for Ornithology

By the end of 1963 the grand total of foreign-ringed birds known to have been recovered in Great Britain and Ireland had reached 10,981 of 145 species. The accompanying table on pages 88-93 gives a breakdown of the species totals into countries of origin. Its headings are self-explanatory with the one exception of the 'Soviet Baltic': this comprises the republics of Latvia, Lithuania and Estonia, and the detached oblast of Kaliningrad. The last contains the big migration station of Rybatschi (the pre-war Rossitten). Pre-war records have been brought into line with present political divisions. Birds used in orientation experiments have been separated in the 'Transported birds' column.

It must be borne in mind that the figures are influenced by the amount of ringing in the countries of origin. Extreme examples arise from the paucity of ringing in Iberia and Africa (in all, fewer than 20 recoveries in the British Isles), yet it is abundantly clear from the results of the British ringing scheme that very large numbers of birds move between and beyond our islands and the western Mediterranean. On the other hand, many birds have been ringed in Switzerland, Czechoslovakia, Hungary and Italy, so it cannot be coincidence that so few from these countries have been found in the British Isles. A factor which will be of greater importance in the future than it has in the past concerns the attitudes of some national ringing schemes to the ringing of species for which they already have many recoveries. In 1959 the principal Norwegian scheme restricted the ringing of Lapwings, Fieldfares, Starlings and gulls. Similar decisions have been taken subsequently in Sweden, Denmark, Germany and the Netherlands, with particular regard to Common and Black-headed Gulls, Blackbirds and Starlings. Since 1961 the Netherlands have also greatly reduced the numbers of Mallard and Teal being ringed.

Inevitably, wildfowl loom large in the totals of recoveries. Though ringing in autumn and winter in the Netherlands, Belgium and France

*The table which accompanies this summary was originally designed to form part of the latest list of 'Recoveries in Great Britain and Ireland of birds ringed abroad' in the 1964 Ringing Supplement (*Brit. Birds*, 57: 541-596). Considerations of space then forced us to hold it over, but, as this is the first published statement of the amount of material collected in 58 years of ringing, we feel that it is of sufficient interest to justify separate publication. We therefore asked Mr. Hudson to supply this short discussion of the figures in the table.—Eds.

Origins of foreign-ringed birds found in Great Britain and Ireland, 1906-63

The numbers correspond to the scientific names on page 94.

	North America	Greenland	Iceland	Faeroes	Spitsbergen	U.S.S.R. proper	Soviet Baltic	Poland	Finland	Sweden
(1) Red-throated Diver	–	1	–	–	–	–	–	–	–	–
(2) Slavonian Grebe	–	–	–	–	–	1	–	–	–	–
(3) Little Grebe	–	–	–	–	–	–	–	–	–	–
(4) Manx Shearwater	–	–	–	–	–	–	–	–	–	–
(5) Gannet	–	–	–	–	–	–	–	–	–	–
(6) Cormorant	–	–	–	–	–	–	–	–	–	–
(7) Shag	–	–	–	–	–	–	–	–	–	–
(8) Heron	–	–	–	–	–	–	–	1	–	28
(9) Bittern	–	–	–	–	–	–	–	–	–	1
(10) White Stork	–	–	–	–	–	–	–	–	–	–
(11) Spoonbill	–	–	–	–	–	–	–	–	–	–
(12) Mallard	–	–	2	–	–	15	–	–	28	25
(13) Teal	–	–	57	–	–	10	3	–	16	12
(14) Garganey	–	–	–	–	–	–	–	–	–	–
(15) Gadwall	–	–	13	–	–	–	–	–	–	–
(16) Wigeon	–	–	67	–	–	16	1	–	2	3
(17) Pintail	2	–	9	–	–	2	1	–	1	–
(18) Shoveler	–	–	1	–	–	2	3	–	1	1
(19) Scaup	–	–	60	–	–	–	–	–	–	–
(20) Tufted Duck	–	–	54	–	–	1	–	–	4	2
(21) Pochard	–	–	–	–	–	1	3	–	2	–
(22) Mandarin	–	–	–	–	–	–	–	–	–	–
(23) Goldeneye	–	–	–	–	–	–	–	–	–	9
(24) Velvet Scoter	–	–	–	–	–	–	–	–	1	–
(25) Common Scoter	–	–	1	–	–	–	–	–	–	–
(26) Red-breasted Merganser	–	–	7	–	–	–	–	–	–	–
(27) Goosander	–	–	–	–	–	–	–	–	1	2
(28) Shelduck	–	–	–	–	–	–	–	–	–	2
(29) Grey Lag Goose	–	–	19	–	–	–	–	–	–	–
(30) White-fronted Goose	–	156	–	–	–	–	–	–	–	–
(31) Bean Goose	–	–	–	–	–	–	–	–	–	1
(32) Pink-footed Goose	–	2	1960	–	2	–	–	–	–	–
(33) Brent Goose	–	–	–	–	4	–	–	–	–	–
(34) Barnacle Goose	–	28	–	–	102	–	–	–	–	–
(35) Mute Swan	–	–	–	–	–	–	1	–	–	–
(36) Whooper Swan	–	–	4	–	–	–	–	–	–	–
(37) Bewick's Swan	–	–	–	–	–	–	–	–	–	–
(38) Rough-legged Buzzard	–	–	–	–	–	–	–	–	–	1
(39) Sparrowhawk	–	–	–	–	–	–	–	–	1	–
(40) Marsh Harrier	–	–	–	–	–	–	–	–	–	–
(41) Hen Harrier	–	–	–	–	–	–	–	–	1	–
(42) Montagu's Harrier	–	–	–	–	–	–	–	–	–	–
(43) Osprey	–	–	–	–	–	–	–	–	–	8
(44) Hobby	–	–	–	–	–	–	–	–	–	1
(45) Peregrine	–	–	–	–	–	–	–	–	–	6
(46) Merlin	–	–	5	–	–	–	–	–	–	–
(47) Kestrel	–	–	–	–	–	–	–	1	2	2
(48) Water Rail	–	–	–	–	–	–	–	–	–	–
(49) Moorhen	–	–	–	–	–	–	–	–	–	–

Belgium	Channel Islands	Germany	Switzerland/Austria	Czechoslovakia	Hungary	Italy	France	Spain	Portugal	Morocco	Transported birds	GRAND TOTALS, 1906-63	TOTALS, 1963 ALONE
–	–	–	–	–	–	–	–	–	–	–	–	1	–
–	–	–	–	–	–	–	–	–	–	–	–	1	1
–	–	–	–	–	–	–	–	–	–	–	–	1	–
–	–	–	–	–	–	–	2	–	–	–	–	2	–
–	11	–	–	–	–	–	1	–	–	–	–	12	1
2	–	2	–	–	–	–	–	–	–	–	–	7	–
–	3	–	–	–	–	–	–	–	–	–	–	3	–
2	–	2	–	–	–	–	13	–	–	–	–	198	4
2	–	2	–	–	–	–	–	–	–	–	–	5	1
–	–	–	–	–	–	–	–	–	–	–	–	2	–
–	–	–	–	–	–	–	–	–	–	–	–	2	–
109	–	4	–	–	–	–	3	–	–	–	–	307	43
75	–	2	–	–	–	–	53	–	–	–	–	1322	54
3	–	–	–	–	–	–	–	–	–	–	–	11	–
–	–	–	–	–	–	–	–	–	–	–	–	17	–
8	–	1	1	–	–	–	–	–	–	–	–	171	17
–	–	–	–	–	–	–	–	–	–	–	–	49	11
2	–	–	–	–	–	–	1	–	–	–	–	44	6
–	–	–	–	–	–	–	–	–	–	–	–	60	–
–	–	–	–	1	–	–	–	–	–	–	–	68	4
–	–	–	–	2	–	–	1	–	–	–	–	15	4
–	–	–	–	–	–	–	–	–	–	–	–	2	2
–	–	–	–	–	–	–	–	–	–	–	–	9	–
–	–	–	–	–	–	–	–	–	–	–	–	2	1
–	–	–	–	–	–	–	–	–	–	–	–	1	–
–	–	–	–	–	–	–	–	–	–	–	–	7	–
–	–	–	–	–	–	–	–	–	–	–	–	3	–
2	–	54	–	–	–	–	–	–	–	–	–	66	18
–	–	2	–	–	–	–	–	–	–	–	–	21	3
–	–	–	–	–	–	–	–	–	–	–	–	176	7
–	–	–	–	–	–	–	–	–	–	–	–	2	–
–	–	–	–	–	–	–	–	–	–	–	–	1964	40
–	–	–	–	–	–	–	–	–	–	–	–	5	1
–	–	–	–	–	–	–	–	–	–	–	–	130	98
–	–	–	–	–	–	–	–	–	–	–	–	2	1
–	–	–	–	–	–	–	–	–	–	–	–	4	2
–	–	–	–	–	–	–	1	–	–	–	–	2	–
–	–	–	–	–	–	–	–	–	–	–	–	1	–
–	–	6	–	–	–	–	–	–	–	–	–	13	–
–	–	–	–	–	–	–	–	–	–	–	–	1	–
1	–	–	–	–	–	–	–	–	–	–	–	2	1
–	–	–	–	–	–	–	–	–	–	–	–	1	–
–	–	–	–	–	–	–	–	–	–	–	–	8	–
–	–	–	–	–	–	–	–	–	–	–	–	1	–
–	–	–	–	–	–	–	–	–	–	–	–	8	–
–	–	–	–	–	–	–	–	–	–	–	–	5	1
2	–	–	–	–	–	–	–	–	–	–	–	12	–
–	–	4	–	–	–	–	–	–	–	–	–	6	–
2	–	–	–	–	–	–	–	–	–	–	–	22	3

	North America	Greenland	Iceland	Faeroes	Spitsbergen	U.S.S.R. proper	Soviet Baltic	Poland	Finland	Sweden
(50) Coot	–	–	–	–	–	–	2	–	–	–
(51) Oystercatcher	–	–	13	17	–	–	–	–	–	–
(52) Lapwing	–	–	–	–	–	–	8	1	3	43
(53) Ringed Plover	–	–	–	–	–	–	–	–	–	2
(54) Grey Plover	–	–	–	–	–	–	–	–	–	–
(55) Golden Plover	–	–	61	1	–	–	–	–	–	–
(56) Turnstone	–	3	6	–	–	–	–	–	–	–
(57) Snipe	–	–	32	–	–	–	–	–	5	5
(58) Jack Snipe	–	–	–	–	–	–	–	–	–	–
(59) Woodcock	–	–	–	–	–	1	2	–	5	19
(60) Curlew	–	–	–	–	–	–	–	–	49	55
(61) Whimbrel	–	–	3	–	–	–	–	–	–	–
(62) Bar-tailed Godwit	–	–	–	–	–	–	–	–	–	–
(63) Common Sandpiper	–	–	–	–	–	–	–	–	1	–
(64) Redshank	–	–	15	–	–	–	–	–	–	–
(65) Knot	1	–	14	–	–	–	–	–	–	1
(66) Purple Sandpiper	–	–	–	–	–	–	–	–	–	–
(67) Little Stint	–	–	–	–	–	–	–	–	–	–
(68) Temminck's Stint	–	–	–	–	–	–	–	–	1	–
(69) Dunlin	–	–	2	–	–	2	2	1	13	103
(70) Curlew Sandpiper	–	–	–	–	–	–	–	–	–	1
(71) Sanderling	–	–	2	–	–	–	–	–	–	–
(72) Ruff	–	–	–	–	–	–	–	–	–	1
(73) Avocet	–	–	–	–	–	–	–	–	–	–
(74) Great Skua	–	–	2	–	–	–	–	–	–	–
(75) Arctic Skua	–	–	–	2	–	–	–	–	–	–
(76) Great Black-backed Gull	–	–	9	–	–	28	–	–	1	1
(77) Lesser Black-backed Gull	–	–	1	7	–	–	–	–	–	6
(78) Herring Gull	–	–	–	2	–	21	–	–	–	1
(79) Common Gull	–	–	–	–	–	3	26	–	44	189
(80) Iceland Gull	–	2	–	–	–	–	–	–	–	–
(81) Little Gull	–	–	–	–	–	–	2	–	–	1
(82) Black-headed Gull	–	–	6	–	–	–	121	49	159	288
(83) Kittiwake	–	1	–	–	–	14	–	–	–	–
(84) Black Tern	–	–	–	–	–	–	–	–	–	–
(85) Caspian Tern	1	–	–	–	–	–	–	–	–	–
(86) Common Tern	–	–	–	–	–	–	1	–	3	2
(87) Arctic Tern	1	1	–	1	–	–	3	–	–	3
(88) Sandwich Tern	–	–	–	–	–	–	–	–	–	–
(89) Razorbill	–	–	–	–	–	2	–	–	–	–
(90) Guillemot	–	–	–	–	–	1	–	–	–	–
(91) Black Guillemot	–	–	–	–	–	–	–	–	–	1
(92) Puffin	–	–	–	–	–	–	–	–	–	–
(93) Stock Dove	–	–	–	–	–	–	–	–	1	–
(94) Woodpigeon	–	–	–	–	–	–	–	–	–	–
(95) Turtle Dove	–	–	–	–	–	–	–	–	–	–
(96) Collared Dove	–	–	–	–	–	–	–	–	–	–
(97) Cuckoo	–	–	–	–	–	–	–	–	–	–
(98) Long-eared Owl	–	–	–	–	–	–	1	–	–	2

Belgium	Channel Islands	Germany	Switzerland/Austria	Czechoslovakia	Hungary	Italy	France	Spain	Portugal	Morocco	Transported birds	GRAND TOTALS, 1906-63	TOTALS, 1963 ALONE
–	2	1	–	–	–	–	–	–	–	–	–	9	2
–	–	1	–	–	–	–	–	–	–	–	–	41	4
2	–	14	–	6	1	2	2	–	–	–	–	251	6
–	–	6	–	–	–	–	–	–	–	–	–	15	6
–	–	–	–	–	–	–	–	–	–	–	–	1	1
–	–	–	–	–	–	–	–	–	–	–	–	77	2
–	–	–	–	–	–	–	–	–	–	–	–	18	1
6	–	9	–	–	–	–	1	–	–	–	–	83	7
2	–	–	–	–	–	–	–	–	–	–	–	3	–
1	–	10	–	1	–	–	–	–	–	–	–	51	4
5	–	4	–	–	–	–	–	–	–	–	–	134	12
–	–	–	–	–	–	–	–	–	–	–	–	3	–
–	–	–	–	–	–	–	–	–	–	–	–	12	–
–	–	–	–	–	–	–	–	–	–	–	–	1	–
1	–	–	–	–	–	–	1	–	–	–	–	19	2
–	–	3	–	–	–	–	–	–	–	–	–	53	5
–	–	–	–	–	–	–	–	–	–	–	–	1	–
–	–	–	–	–	–	–	–	–	–	–	–	1	–
–	–	–	–	–	–	–	–	–	–	–	–	1	–
1	–	5	–	–	–	–	–	–	–	–	–	258	58
–	–	–	–	–	–	–	–	–	–	–	–	2	1
–	–	–	–	–	–	–	–	–	–	–	–	9	1
–	–	–	–	–	–	–	–	–	–	–	–	1	–
–	–	–	–	–	–	–	1	–	–	–	–	2	–
–	–	–	–	–	–	–	–	–	–	–	–	2	1
–	–	–	–	–	–	–	–	–	–	–	–	2	–
–	–	–	–	–	–	–	1	–	–	–	–	109	11
–	–	–	–	–	–	–	1	–	–	–	–	23	–
–	1	1	–	–	–	–	2	–	–	–	–	75	3
–	–	103	–	–	–	–	–	–	–	–	–	708	57
–	–	–	–	–	–	–	–	–	–	–	–	2	–
–	–	–	–	–	–	–	–	–	–	–	–	3	1
24	–	236	1	105	–	–	–	–	–	–	1	1592	220
–	–	1	–	–	–	–	2	–	–	–	–	35	5
–	–	–	–	–	–	–	–	–	–	–	–	1	–
–	–	–	–	–	–	–	–	–	–	–	–	1	–
–	–	11	–	–	–	–	–	–	1	–	–	21	–
–	–	3	–	–	–	–	–	–	–	–	–	12	–
–	–	1	–	–	–	–	–	–	–	–	–	9	–
–	–	–	–	–	–	–	1	–	–	–	–	3	1
–	–	11	–	–	–	–	–	–	–	–	–	13	4
–	–	–	–	–	–	–	–	–	–	–	–	1	–
–	2	–	–	–	–	–	1	–	–	–	–	6	–
–	–	–	–	–	–	–	–	–	–	–	–	2	–
–	–	–	–	–	–	–	–	–	–	–	–	2	–
–	–	–	–	–	–	–	–	–	3	–	–	3	–
–	–	1	–	–	–	–	–	–	–	–	–	1	–
–	–	1	–	–	–	–	–	–	–	–	–	1	–
–	–	2	–	–	–	–	–	–	–	–	–	10	–

	North America	Greenland	Iceland	Faeroes	Spitsbergen	U.S.S.R. proper	Soviet Baltic	Poland	Finland	Sweden
(99) Short-eared Owl	–	–	–	–	–	–	–	–	1	–
(100) Swift	–	–	–	–	–	–	–	–	–	–
(101) Skylark	–	–	–	–	–	–	–	–	–	1
(102) Swallow	–	–	–	–	–	–	–	–	–	–
(103) House Martin	–	–	–	–	–	–	–	–	–	–
(104) Sand Martin	–	–	–	–	–	–	–	–	–	–
(105) Hooded Crow	–	–	–	–	–	–	–	–	–	3
(106) Rook	–	–	–	–	–	4	7	1	–	–
(107) Jackdaw	–	–	–	–	–	–	–	–	–	1
(108) Great Tit	–	–	–	–	–	–	–	–	–	–
(109) Blue Tit	–	–	–	–	–	–	–	–	–	–
(110) Fieldfare	–	–	–	–	–	1	–	–	5	13
(111) Song Thrush	–	–	–	–	–	–	–	–	–	3
(112) Redwing	–	–	36	–	–	–	1	–	13	2
(113) Blackbird	–	–	1	–	–	–	1	–	17	40
(114) Wheatear	–	2	2	–	–	–	–	–	–	–
(115) Redstart	–	–	–	–	–	–	–	–	–	1
(116) Black Redstart	–	–	–	–	–	–	–	–	–	–
(117) Robin	–	–	–	–	–	–	1	1	2	1
(118) Reed Warbler	–	–	–	–	–	–	–	–	–	–
(119) Sedge Warbler	–	–	–	–	–	–	–	–	–	–
(120) Blackcap	–	–	–	–	–	–	–	–	–	–
(121) Garden Warbler	–	–	–	–	–	–	–	–	–	–
(122) Whitethroat	–	–	–	–	–	–	–	–	–	–
(123) Willow Warbler	–	–	–	–	–	–	–	–	–	1
(124) Chiffchaff	–	–	–	–	–	–	–	–	–	–
(125) Spotted Flycatcher	–	–	–	–	–	–	–	–	–	–
(126) Pied Flycatcher	–	–	–	–	–	–	–	–	–	–
(127) Dunnock	–	–	–	–	–	–	–	–	–	–
(128) Meadow Pipit	–	–	1	–	–	–	–	–	–	–
(129) Rock Pipit	–	–	–	–	–	–	–	–	–	2
(130) Pied/White Wagtail	–	–	4	–	–	–	–	–	–	–
(131) Grey Wagtail	–	–	–	–	–	–	–	–	–	–
(132) Yellow Wagtail	–	–	–	–	–	–	–	–	–	–
(133) Waxwing	–	–	–	–	–	–	–	–	1	1
(134) Starling	–	–	–	–	–	32	291	48	44	204
(135) Greenfinch	–	–	–	–	–	–	–	–	–	–
(136) Goldfinch	–	–	–	–	–	–	–	–	–	–
(137) Siskin	–	–	–	–	–	–	–	1	–	–
(138) Linnet	–	–	–	–	–	–	–	–	–	–
(139) Twite	–	–	–	–	–	–	–	–	–	–
(140) Redpoll	–	–	–	–	–	–	–	–	–	–
(141) Bullfinch	–	–	–	–	–	–	–	–	–	–
(142) Chaffinch	–	–	–	–	–	–	2	–	3	3
(143) Brambling	–	–	–	–	–	–	–	–	–	–
(144) Reed Bunting	–	–	–	–	–	–	–	–	–	–
(145) Tree Sparrow	–	–	–	–	–	–	–	–	–	–
TOTALS	5	196	2469	30	108	157	483	104	431	1104

Belgium	Channel Islands	Germany	Switzerland/Austria	Czechoslovakia	Hungary	Italy	France	Spain	Portugal	Morocco	Transported birds	GRAND TOTALS, 1906-63	TOTALS, 1963 ALONE
–	–	–	–	–	–	–	–	–	–	–	–	1	1
–	–	–	–	–	–	–	–	–	–	–	–	1	–
1	–	3	–	–	–	–	–	–	–	–	–	6	1
4	6	1	–	–	–	–	2	–	–	2	–	16	7
–	–	1	–	–	–	–	–	–	–	–	–	1	1
1	2	–	–	–	–	–	4	–	–	2	–	10	7
–	–	–	–	–	–	–	–	–	–	–	2	10	–
–	–	12	–	–	–	–	–	–	–	–	–	45	–
1	–	–	–	–	–	–	–	–	–	–	–	8	–
–	–	2	–	–	–	–	–	–	–	–	–	3	–
1	–	1	–	–	–	–	1	–	–	–	–	3	–
–	–	3	–	–	–	–	–	–	–	–	–	64	7
13	–	12	–	–	–	–	–	–	–	–	1	42	13
6	–	3	1	–	–	–	–	–	–	–	–	70	30
9	–	75	–	–	–	–	1	–	–	–	1	222	19
–	–	–	–	–	–	–	–	–	–	–	–	4	–
–	–	2	–	–	–	–	–	–	–	–	–	4	–
–	–	1	–	–	–	–	–	–	–	–	–	1	–
–	2	–	–	–	–	–	–	–	–	–	–	8	1
–	1	–	–	–	–	–	–	–	–	–	–	1	–
–	2	–	–	–	–	–	–	–	–	–	–	2	–
–	–	1	1	–	–	–	–	–	–	–	–	2	–
–	–	2	–	–	–	–	–	–	–	–	–	2	–
–	1	1	–	–	–	–	1	–	1	–	–	5	–
–	–	1	–	–	–	–	1	–	–	–	–	3	–
–	1	1	–	–	–	–	–	–	–	–	–	2	–
–	–	2	–	–	–	–	2	–	–	–	–	4	–
–	–	1	–	–	–	–	–	–	–	–	–	1	–
–	–	1	–	–	–	–	1	–	–	–	–	2	1
2	–	–	–	–	–	–	1	–	–	–	–	4	–
–	–	1	–	–	–	–	1	–	–	–	–	5	2
–	1	–	–	–	–	–	–	–	–	–	–	5	–
1	–	–	–	–	–	–	–	–	1	–	–	2	–
–	2	–	–	–	–	–	–	–	–	–	–	2	1
–	–	–	–	–	–	–	–	–	–	–	–	2	1
35	–	231	–	–	–	–	1	–	–	–	28	1737	125
3	2	1	–	–	–	–	6	–	–	–	–	14	1
–	–	–	–	–	–	–	4	1	2	–	–	8	2
3	–	2	–	–	–	–	1	–	–	–	–	10	–
3	–	–	–	–	–	–	4	4	–	–	–	13	2
–	–	–	–	–	–	–	–	–	–	–	–	1	–
–	–	–	–	–	–	–	–	–	–	–	–	2	–
–	–	–	–	–	–	–	–	–	–	–	–	1	–
58	–	8	–	–	–	–	2	–	–	–	–	156	26
8	–	–	–	1	–	–	–	–	–	–	–	16	1
–	–	–	–	–	–	–	–	–	–	–	–	2	–
–	–	–	–	–	–	–	1	–	–	–	–	1	–
401	39	872	4	116	1	2	122	5	8	4	33	10981	988

Scientific names of species included in the table

The numbers correspond to those in the table

(1) *Gavia stellata*
(2) *Podiceps auritus*
(3) *Podiceps ruficollis*
(4) *Procellaria puffinus*
(5) *Sula bassana*
(6) *Phalacrocorax carbo*
(7) *Phalacrocorax aristotelis*
(8) *Ardea cinerea*
(9) *Botaurus stellaris*
(10) *Ciconia ciconia*
(11) *Platalea leucorodia*
(12) *Anas platyrhynchos*
(13) *Anas crecca*
(14) *Anas querquedula*
(15) *Anas strepera*
(16) *Anas penelope*
(17) *Anas acuta*
(18) *Spatula clypeata*
(19) *Aythya marila*
(20) *Aythya fuligula*
(21) *Aythya ferina*
(22) *Aix galericulata*
(23) *Bucephala clangula*
(24) *Melanitta fusca*
(25) *Melanitta nigra*
(26) *Mergus serrator*
(27) *Mergus merganser*
(28) *Tadorna tadorna*
(29) *Anser anser*
(30) *Anser albifrons*
(31) *Anser fabalis*
(32) *Anser brachyrhynchus*
(33) *Branta bernicla*
(34) *Branta leucopsis*
(35) *Cygnus olor*
(36) *Cygnus cygnus*
(37) *Cygnus columbianus*
(38) *Buteo lagopus*
(39) *Accipiter nisus*
(40) *Circus aeruginosus*
(41) *Circus cyaneus*
(42) *Circus pygargus*
(43) *Pandion haliaëtus*
(44) *Falco subbuteo*
(45) *Falco peregrinus*
(46) *Falco columbarius*
(47) *Falco tinnunculus*
(48) *Rallus aquaticus*
(49) *Gallinula chloropus*
(50) *Fulica atra*
(51) *Haematopus ostralegus*
(52) *Vanellus vanellus*
(53) *Charadrius hiaticula*
(54) *Charadrius squatarola*
(55) *Charadrius apricarius*
(56) *Arenaria interpres*
(57) *Gallinago gallinago*
(58) *Lymnocryptes minimus*
(59) *Scolopax rusticola*
(60) *Numenius arquata*
(61) *Numenius phaeopus*
(62) *Limosa lapponica*
(63) *Tringa hypoleucos*
(64) *Tringa totanus*
(65) *Calidris canutus*
(66) *Calidris maritima*
(67) *Calidris minuta*
(68) *Calidris temminckii*
(69) *Calidris alpina*
(70) *Calidris testacea*
(71) *Crocethia alba*
(72) *Philomachus pugnax*
(73) *Recurvirostra avosetta*
(74) *Catharacta skua*
(75) *Stercorarius parasiticus*
(76) *Larus marinus*
(77) *Larus fuscus*
(78) *Larus argentatus*
(79) *Larus canus*
(80) *Larus glaucoides*
(81) *Larus minutus*
(82) *Larus ridibundus*
(83) *Rissa tridactyla*
(84) *Chlidonias niger*
(85) *Hydroprogne caspia*
(86) *Sterna hirundo*
(87) *Sterna macrura*
(88) *Sterna sandvicensis*
(89) *Alca torda*
(90) *Uria aalge*
(91) *Cepphus grylle*
(92) *Fratercula arctica*
(93) *Columba oenas*
(94) *Columba palumbus*
(95) *Streptopelia turtur*
(96) *Streptopelia decaocto*
(97) *Cuculus canorus*
(98) *Asio otus*
(99) *Asio flammeus*
(100) *Apus apus*
(101) *Alauda arvensis*
(102) *Hirundo rustica*
(103) *Delichon urbica*
(104) *Riparia riparia*
(105) *Corvus corone cornix*
(106) *Corvus frugilegus*
(107) *Corvus monedula*
(108) *Parus major*
(109) *Parus caeruleus*
(110) *Turdus pilaris*
(111) *Turdus philomelos*
(112) *Turdus iliacus*
(113) *Turdus merula*
(114) *Oenanthe oenanthe*
(115) *Phoenicurus phoenicurus*
(116) *Phoenicurus ochruros*
(117) *Erithacus rubecula*
(118) *Acrocephalus scirpaceus*
(119) *Acrocephalus schoenobaenus*
(120) *Sylvia atricapilla*
(121) *Sylvia borin*
(122) *Sylvia communis*
(123) *Phylloscopus trochilus*
(124) *Phylloscopus collybita*
(125) *Muscicapa striata*
(126) *Muscicapa hypoleuca*
(127) *Prunella modularis*
(128) *Anthus pratensis*
(129) *Anthus spinoletta*
(130) *Motacilla alba*
(131) *Motacilla cinerea*
(132) *Motacilla f. flavissima*
(133) *Bombycilla garrulus*
(134) *Sturnus vulgaris*
(135) *Chloris chloris*
(136) *Carduelis carduelis*
(137) *Carduelis spinus*
(138) *Carduelis cannabina*
(139) *Carduelis flavirostris*
(140) *Carduelis flammea*
(141) *Pyrrhula pyrrhula*
(142) *Fringilla coelebs*
(143) *Fringilla montifringilla*
(144) *Emberiza schoeniclus*
(145) *Passer montanus*

account for the majority of ducks (especially the surface-feeders) there are good series from Iceland, the Soviet Union and Fenno-Scandia. The large numbers of Scaup and Tufted Duck from Iceland are especially noteworthy. The two Wildfowl Trust expeditions to Iceland in 1951 and 1953, from which came most of the Pink-footed Geese, are well known. Less so is the recent ringing of Barnacle Geese on Spitsbergen, which has shown that the population from this region winters predominantly in the Solway Firth, separated even at this season from the Barnacle Geese of Greenland and Siberia (Boyd 1963: 90-91).

The waders likewise figure prominently in recovery lists, doubtless because they too are much shot. The largest total is for the Dunlin, though unfortunately the majority are ringed while on passage (mostly in south Scandinavia) and so we cannot know their breeding grounds. On the other hand, Lapwings, with the second largest total, are for the most part ringed as chicks (note especially those from Czechoslovakia and Hungary). The Turnstone and Knot recoveries show that the British Isles receive separate streams of immigrants from the Nearctic and Palearctic regions. The Knot from North America was ringed on Ellesmere Island (80°N), which is within the range of the typical race (see *A.O.U. Checklist*, 1957). Two other species—the Oystercatcher and the Golden Plover—come in substantial numbers from Iceland and the Faeroes. There are very few recoveries of Oystercatchers ringed on the Continent, though the Golden Plovers ringed in the Netherlands (in winter) are almost certainly of Scandinavian and Russian origin. The rarity of Redshank from the Continent to the British Isles (four recoveries) has already been commented on (Ogilvie 1963: 143); only two of these are likely to have been of the typical race.

The post-war increase in ornithological work in the Murmansk region of the U.S.S.R. (Tatarinkova 1963: 176) has resulted in many British recoveries of maritime species ringed there. Razorbills from this source in Cornwall in 1957 and in East Lothian in 1963 were, respectively, the third and fourth British records of the northern subspecies (there was a fifth in 1964). A breeding adult Guillemot marked on Kharlov Island, Murmansk, in 1940 was recovered in Co. Durham in May 1950. Russian ornithologists (Dementiev and Gladkov 1951-54, Kozlova 1957) consider that the race of Guillemot breeding in Murmansk is *Uria aalge hyperborea*, a form not yet included on the British and Irish List; *hyperborea* was accepted as a valid race by Witherby *et al.* (1938-41: 153, 158) who gave it as the form breeding on Bear Island (the type locality). A further interesting racial aspect concerns the Karelian Herring Gull *Larus argentatus omissus*; though called the Scandinavian Herring Gull in *The Handbook* this is a misnomer, for it is the breeding form of Finland and the White Sea. The

1952 *Check-List of the Birds of Great Britain and Ireland* included this race as a straggler accredited with eleven records. By 1963 there were 21 recoveries of Herring Gulls ringed in Murmansk, where *omissus* is the breeding form, and such recoveries have been annual since 1959 (with five in 1962) coinciding with a big increase in ringing in Murmansk. Leach (1944: 159) suggested that this race might be of more frequent occurrence in Britain than had been supposed; from the subsequent accumulation of recoveries I believe *omissus* to be an annual winter visitor here in small numbers, but regular only while in immature plumage. A similar tendency for young birds to migrate further south than adults has been shown for the closely related Lesser Black-backed Gull (Harris 1962: 179).

It will be noticed that passerines do not figure very prominently in the table, with the obvious exceptions of Blackbirds and Starlings. The paucity of recoveries of trans-Saharan migrants is largely due to the small scale of ringing south of the British Isles; the Swallows and Sand Martins from Morocco were ringed by a British expedition. It is difficult to account for the very few recoveries of foreign-ringed Skylarks and Meadow Pipits, for these two birds, especially the former, are winter visitors and passage migrants in large numbers. The recoveries of finches from Belgium and the Netherlands are of less value than might appear at first sight, for most were ringed while on passage.

When recoveries are few it is often difficult to know which represent irregular or exceptional movements. The White Storks from Denmark and the Avocet from France (Camargue) may fairly be called irregular, but this is less likely to be true of the Spoonbills from the Netherlands and the Iceland Gulls from Greenland. Recoveries of the larger birds of prey are rare, but this reflects scarcity rather than irregularity of movement; the one Rough-legged Buzzard recovery was as long ago as 1926, though this species visits the British Isles annually. Among common species, the Blackcap from Austria, the Great Tit from Saxony and the Brambling from Czechoslovakia were quite unexpected. And certainly the Caspian Tern from North America (Lake Michigan) in Yorkshire in 1939 cannot have been anything but a vagrant.

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Notes

Mallard's devotion to nest in face of fire.—On 13th April 1964, while attempting to beat out a grass fire covering some 50 square yards at Ditchford gravel-pits near Wellingborough, Northamptonshire, L. York was amazed to see a female Mallard *Anas platyrhynchos* rise from her nest when it was completely ringed with flames. The nest itself had escaped serious damage, but seven of the clutch of twelve eggs were scorched. All these seven eggs proved to contain fully developed young.

The remaining five eggs were left in the nest and the following morning the Mallard was found to have resumed incubation although she was now completely exposed to view. Five days later what was believed to be the same bird was seen leading four ducklings to the water's edge some sixty yards away; the nest now contained one unhatched egg and no other Mallards were known to be breeding in the vicinity.

N. L. HODSON

Kestrel taking bird missed by Peregrine.—On 29th November 1964, at South Walney Nature Reserve, Lancashire, Jack Sheldon and I were watching a bird of prey flying at an estimated height of 400-500 feet when it suddenly stooped. When it had dropped to a height of about 200 feet we could see that a small passerine was the target. After much twisting and turning, by which time the two birds were only about 50 feet from the ground and some 30 yards from us, they were identified as a first-winter male Peregrine *Falco peregrinus* and a female Chaffinch *Fringilla coelebs*. The Chaffinch landed in a bramble bush while the Peregrine was still about 25 feet above the ground. Immediately, another bird of prey hurtled in from our left at a height of three to four feet and caught the Chaffinch in the bush. This second predator was a female Kestrel *Falco tinnunculus* which, after a few seconds, flew off to the right with the Chaffinch in her talons. During this time the Peregrine had veered away and landed on a dry stone wall about 100 yrads away to the left.

It seemed surprising to us that a Kestrel should step in on the prey of a Peregrine and that the latter should give up so easily even though it had failed to catch the Chaffinch in the air. E. F. PITHERS

Swallows living inside engineering works until late November.— In 1964 a large new engineering workshop for the repair of mining equipment was opened by Stewarts and Lloyds Minerals Department in an area of plantations along the Gretton road near Corby, Northamptonshire. On 24th September five Swallows *Hirundo rustica* were seen hawking insects among the roof girders inside the workshop and passing in and out of the shutter doors at both ends of the main bay. By 28th September the number had increased to 14 and they had begun to roost within the building (which was vacated each evening by the staff).

During October the thermostatically controlled heating in the building was switched on and this remained on day and night thereafter. The Swallows continued to roost among the roof girders, but would hawk over the plantations for at least part of the day whenever the doors were opened although there still appeared to be insects available for them inside too. On 30th October one Swallow was picked up dead and the same thing happened the following morning, the number thus being reduced to twelve. On 4th November only ten were seen (but no further bodies were found then or later). These were still present on the evening of the 6th, but by the next morning a further eight were missing. The two which remained were quite active, but from about mid-November they stayed among the roof girders and were not seen to leave the building at all. Both were still there on the 25th, but one had disappeared by the following day and the last one could not be found on the 27th.

Some of the above is based on personal observations and the rest on reports from the staff of the workshop. N. L. HODSON

Reviews

Birds of the Scilly Isles. By Hilda M. Quick. Bradford Barton, Truro, 1964. 125 pages; line-drawings. 10s. 6d. (paper-back); 21s. (hard-covers).

This unpretentious little book is the first ever published on the birds of the Isles of Scilly. Primarily intended for the beginner and ordinary visitor noticing birds for the first time, it contains a large part devoted to hints on how to identify the birds most likely to be seen. With these interests in mind, the author has avoided the stylistic limitations of a systematic list; although this has resulted in a book which is

eminently readable, the treatment of species tends, perhaps inevitably, to be uneven. Nevertheless, for many there are useful and original observations on behaviour and local habits, as well as brief details of distribution and status. Short chapters describe the main features of the islands themselves and trace the changes which have occurred among the breeding birds during the present century. The book ends with a useful check-list (which neither is nor claims to be complete) of 270 or so species recorded in the past 33 years.

Written in an easy, rather anecdotal style, the book is pleasantly illustrated with Miss Quick's own highly original and lively line-drawings. The paper-backed edition represents especially good value and, with increasing numbers of bird-watchers now visiting Scilly on their annual holidays, is assured of the success it deserves.

J. L. F. PARSLOW

Birds of Prey. By Philip Brown. Deutsch, London, 1964. 124 pages; one colour and 21 black-and-white photos. 22s. 6d.

This is the first of the 'Survival Books', edited by Colin Willock, which originated in a series of television films on the relation between people and animals. There is a chapter about each of the main British birds of prey, describing their natural history and changes in numbers; also a chapter on persecution and protection and another on the recent effects of toxic pesticides. The book is illustrated by 17 pages of fine photographs, including one in colour.

There are various inaccuracies, for example that breeding Hen Harriers have spread to the Scottish mainland only in the last ten years or so and are numerous only in Orkney. The author guesses about Golden Eagle breeding and survival and then speculates rather wildly that a Scottish eagle population of 3,000 pairs in the 18th century has been reduced to 200 today by persecution. He states that a pair of eagles even when feeding young take probably less than 1% of the grouse on their territory, especially the less healthy grouse, and the shooter should not grudge bagging 198 instead of 200. To be fair to the author, it is clear here that he is passing on a statement by somebody else. However, one cannot assess the value of such statements, since there are no references or bibliography. It may be argued that a more thorough approach would have made the book unsaleable to the wide public it is aimed at, but popularisation need not necessarily mean not sticking to well-established facts.

The job of the conservationist is not yet simply a matter of education, and a lot of good research is still needed before scientists, let alone gamekeepers, accept that predators do so little harm to breeding game. Unfortunately, such generalisations may convince keepers and land-owners in their widely held attitude that protectionists are pushing

preconceived opinions. On the other hand, it must be made clear that whereas protectionists do generally read and accept scientific findings about predation, most keepers and landowners do neither and hence are much more extreme and subjective in their opinions. It should also be said that scientific evidence against the keepers' opinions is steadily piling up, while evidence for them scarcely exists. Within the last twelve months alone, papers on Red Grouse and Ptarmigan in Scotland, and on Lemmings in Canada, have shown that predation does not have an important effect on the numbers of these animals.

This book quotes the admirable policy of Col. R. Meinertzhagen who allowed predators to increase greatly on an estate near Ben Wyvis and whose grouse bag also greatly increased. However, J. M. D. Mackenzie (*J. Anim. Ecol.*, 21: 152) showed that grouse bags on many other estates in central, north-west and west Scotland increased over the same period. Hence the Wyvis policy demonstrated that a lot of game could be shot in spite of many predators, but gave no evidence to rebut the gamekeeper's stock reply that more would have been shot if the predators had been absent. In the chapter on owls, the Barn Owl is said to be Britain's most useful bird because it preys heavily on rodents. But, if one says that owls are useful in keeping down rodents, one cannot have it both ways by also saying that birds of prey have no effect on game-birds. Unfortunately, the subject of predation is so emotionally charged that objective appraisal is difficult, but clearly a more critical approach is required.

This review is for an ornithological journal and is therefore critical of the natural history, but the book will be useful to ornithologists in providing handy summaries about present stocks of British birds of prey. From other points of view it cannot be praised too highly. It gives a refreshing personal account by a leading protectionist about what is being done to care for these birds. They are still one of the finest features of wild life in Britain, and in some cases, like the good populations of Golden Eagles, are a showpiece even for Europe. It is a readable and enthusiastic plea for conservation of predators and it will educate a wide public about conservation in general in this over-populated island. It will do a lot of good by awakening people to the dangers of toxic pesticides. It will make the public—and so also those magistrates who at present impose paltry fines—more aware of the damage done by egg-collectors or pole-trapping gamekeepers. What will eventually put such people completely out of business is not a protection society but an ubiquitous and disapproving public which regards them in the same way as it regards any other common criminals. Already many law-breaking keepers are more wary and careful than they used to be, and this book will do a great service in accelerating the process.

ADAM WATSON

Letters

The absurdity of the term 'soft parts'

Sirs,—In spite of the fact that we recently published a paper entitled 'Diseases of the skin and soft parts of wild birds' (*Brit. Birds,* 57: 175-179), we should like to suggest that the use of the term 'soft parts' in ornithological literature be discontinued and 'appendages' be substituted for it.

As far as we are able to determine, 'soft parts' was first used by H. F. Witherby *et al.* in *The Handbook of British Birds* (1938-41) to describe the bill, legs, feet and iris. Why these authors chose to describe the bill, legs and feet in this way, when they are hard and not soft, is rather extraordinary. We suggest that in future, therefore, 'appendages of the skin' should be regarded as the correct collective term for the bill, claws (nails or talons), feathers and preen gland, whilst the wings, legs and feet should be referred to as 'appendages of the appendicular skeleton'.

We base this proposal on the use of the term 'appendages' in medical and veterinary literature. For example, S. Sisson and J. D. Grossman (1947, *The Anatomy of the Domestic Animals*: 908) stated, when referring to mammalian anatomy, 'The so-called appendages of the skin are modifications of the epidermis and comprise the hairs, hoofs, claws, horns, etc.' A. S. MacNalty (1961, *The British Medical Dictionary*: 125) defined 'appendage' as 'a part or outgrowth from the body or from an organ, small relative to the whole, . . . appendages of the skin, . . . cutaneous appendages, dermal appendages.' The term has already been used in American ornithological literature; for example, O. S. Pettingill (1956, *A Laboratory and Field Manual of Ornithology*: 7) stated, 'The wings are the appendages arising from the shoulder or pectoral girdle', and O. C. Bradley (1950, *The Structure of the Fowl*: 88) referred to the iris as an appendage of the eye.

In view of the above definitions, we think that there is a strong case for the adoption of the term 'appendages' in ornithological literature.

I. F. KEYMER and D. K. BLACKMORE

Sirs,—You have invited me to comment on the foregoing letter from I. F. Keymer and D. K. Blackmore; in doing so I have had the advice of several other ornithologists, as acknowledged below.

In a wider context 'soft parts' is a traditional anatomical term differentiating everything else in the body from the hard skeleton. It has often been applied to birds in this sense, for example by Alfred

Newton in 1896 (*A Dictionary of Birds,* under SKELETON). Some would indeed regard this as the only legitimate meaning, a view expressed in a letter from Dr. N. F. Ticehurst.

In ornithological jargon the term has somehow acquired a special connotation for all the superficially visible parts of a bird other than the plumage. The logic is not apparent, as most of the parts comprised are in fact relatively hard. They are, moreover, heterogeneous—rhamphotheca, podothecae, irides and sometimes the interior of the mouth seen when the bill is agape; also any areas of exposed skin and such structures as combs, wattles and spurs, when present. The common factor is that the colour needs to be recorded while the specimen is fresh.

The origin of this special usage is obscure. Dr. D. A. Bannerman tells me that it was current in the Bird Room of the British Museum (Natural History) when he began work there in 1909 under the aegis of Dr. R. Bowdler Sharpe and W. R. Ogilvie-Grant; Dr. J. M. Harrison has also been familiar with it for a long time. It is of course impracticable to make a thorough search of the literature for incidental occurrences of such a term, but I am not aware of any earlier instance than its regular employment by H. F. Witherby from 1919 onwards as a subheading of descriptions in *A Practical Handbook of British Birds* (1919-24) and *The Handbook of British Birds* (1938-41); neither work defines the term in its glossary. J. D. Macdonald has kindly had a brief search made in the most likely periodical publications of relevant date, and this has disclosed no earlier mention of 'soft parts' than one by Stuart Baker in the *Bulletin of the British Ornithologists' Club* for 1925; and even for some time afterwards the term was seldom used in that journal.

I have recently described the term as being 'somewhat absurd' (1964, *A New Dictionary of Birds,* under TOPOGRAPHY); and where I have occasionally used it myself it has been within deprecatory quotation marks or preceded by 'so-called'. Several text-books, other than Witherby's, that I have particularly examined all dispense with it, including Ralph S. Palmer's *Handbook of North American Birds* (vol. 1, 1962). Most systematic works nevertheless deal with these characters in a separate paragraph, unheaded, in a standard location in each description; this is clearly good practice. J. D. Macdonald tells me that those currently working in the Bird Room of the British Museum (Natural History) tend to avoid using the term in print, although otherwise it has convenience for certain limited purposes. Dr. Dean Amadon writes that in the American Museum of Natural History they have all been 'bothered by the ambiguity of this term'; but he considers its retention necessary, failing the successful establishment of a better one.

Professor J. Berlioz tells me that the French equivalent, which he oes not regard as wholly satisfactory, is '*parties nues*'. Professor E. tresemann knows of no corresponding term in German; and no such eading is used in the text-books of Dr. Ernst Hartert, Professor G. liethammer and others.

My conclusion is that no collective term is required for use in pub-cations; and that it is in fact undesirable to have a formal term mbracing such diverse elements as the horny bill, a flabby comb and ne irides. If a short term is wanted for colloquial use, I suggest that are parts' (in line with the French usage) is as convenient as 'soft arts', more readily understandable and less ambiguous. 'Unfeathered arts' has been suggested, but it is longer and less free from the ambi-uity that it might be taken to include the concealed apteria.

Your correspondents' suggestion of 'appendages of the skin' seems nlikely to gain acceptance. The word 'appendages' already has arious applications, and it is not appropriate to relatively flat struc-ures such as rhamphotheca or podotheca, and still less to the iris or ne buccal cavity. In any event, as your correspondents say, 'appen-ages of the skin' would include the feathers; so the term would not rve the differentiating purpose that is the *raison d'être* of the one to be placed.

A. LANDSBOROUGH THOMSON

News and comment

Edited by Raymond Cordero

ontrolled shooting at Caerlaverock.—In April 1957 the Nature Conservancy ade a National Nature Reserve of Caerlaverock Merses and the adjacent tidal ad-banks, a total of some 13,500 acres in Dumfriesshire. Because this area on the orth shore of the Solway Firth had for many years been a favourite haunt of wild-wlers, the Conservancy had agreed to set aside about 470 acres for controlled ooting. The first seven years of this experiment—described as a 'blueprint for e future'—is the subject of a report prepared by T. Huxley and published last year the Conservancy's Edinburgh office. It discusses the permit system, wardening, e recording of the numbers and species of birds shot and the need for disciplinary tion against bad sportsmen. A high standard of sportsmanship is now maintained permit holders, but vigilant supervision is necessary because 'however good the haviour of permit holders, persons attempting to shoot on the Reserve without rmits present a perpetual problem, tending to lower the overall standard of ooting.' Education in wildfowling, compulsory examination before being issued th a gun licence and compulsory membership of an acceptable wildfowling ganisation are possible long-term aims.

The system was designed for a maximum of 15 guns on the shooting area and e average in the last two seasons has been nine, although occasionally as many as have been recorded on the marsh at one time. The species most often shot in

the seven seasons were Wigeon (942), Pink-footed Goose (836), Grey Lag Goose (649), Mallard (554), Curlew (303), Teal (273), Pintail (163), snipe (102) and Golden Plover (46). With the exception of the last, which are very common but notoriously difficult to shoot, the species frequently shot are abundant ones and vice versa.

All in all, the Caerlaverock experiment seems to have worked well and the report will no doubt prove of great value to the Conservancy in view of the arrangements for controlled shooting at the recently declared National Nature Reserves of Whiteford (Glamorgan) and Lindisfarne (Northumberland).

Young Ornithologists' Club.—The Royal Society for the Protection of Birds has launched the Young Ornithologists' Club to replace the Junior Bird Recorders' Club as a further effort to encourage 'young people to take an active interest in the birds around them and to play their part in combating the growing threats to the wildlife of the world'. There is no lower age limit (the J.B.R.C. did not accept members under 10) and the upper limit is 18. The Club has its own quarterly magazine, *Bird Life*, and there will also be a news sheet between issues. The subscription remains at five shillings a year. There is to be a greatly increased programme of field courses and meetings, as well as special nation-wide projects. The first of these, the Bird Feeding Project, run in conjunction with the Wildlife Youth Service to investigate the feeding, drinking and bathing habits of garden birds in winter, was started in January.

B.T.O. Field Guide changes.—*The Bird in the Hand* first appeared in 1960 as the British Trust for Ornithology's Field Guide No. 6. It has since become apparent, says Peter Davis in the introduction to the latest edition, that the original Part IV—the 'Guide to sexing and ageing'—will require rather frequent revision in the light of new discoveries; whereas Parts I to III, which deal with the basic techniques of handling, ringing and examining the live bird, will not be so susceptible to change. The Trust has decided, therefore, to divide the original volume into two and to publish the guide to age and sex characters as a separate work. *The Bird in the Hand* costs 3s. post free and the *Guide to Ageing and Sexing*, now Field Guide No. 10, 4s. 6d.

Both have now been revised by Peter Davis and the *Guide to Ageing and Sexing* includes an interesting contribution by Dr. C. M. Perrins on ageing by examination of skull ossification. This method can provide a means of checking doubtful characters and gives the ringer the opportunity of ageing many individuals of such species as the Meadow Pipit, for which no reliable plumage-criteria have been found.

'Aves' Section of the Zoological Record.—The great value of the 'Aves' Section of the *Zoological Record*, compiled each year by Lt.-Col. W. P. C. Tenison (Russian literature by A. I. Ivanov), has been emphasised in these pages before (see 'News and comment', March 1964). The recently published issue covering 1963 gives references to over 2,500 books, papers, articles and notes from all parts of the world: as usual, these are listed alphabetically under the names of their authors and indexed by subjects, geographical regions and species. The whole is an essential mine of information to the bird-watcher who wants to know what has been written on any species or aspect of ornithology. This latest issue costs 20s. and may be obtained from the Zoological Society of London, Regent's Park, London, N.W.1.

B.T.O. annual conference and dinner.—This year the British Trust for Ornithology's annual general meeting and dinner will be held outside London and linked with the annual conference. The conference, open to all members and friends, will be at the Hayes Conference Centre, Swanwick, near Alfreton, Derby, from Friday 26th November to Sunday 28th November. The A.G.M. and dinner will be on the Saturday evening.

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The spread of the Collared Dove in Britain and Ireland

By Robert Hudson

INTRODUCTION

The Collared Dove *Streptopelia decaocto* has the distinction of being the only species (other than feral ones) which is not included in the 1952 *Checklist of the Birds of Great Britain and Ireland*, but which has now been seen within these islands by all bird-watchers with a mind to do so. This is a measure of the spectacular rate of colonisation. After just ten years with us, the Collared Dove now outnumbers the familiar Turtle Dove *S. turtur* in many areas, notably in northern England and in Scotland and Ireland. Yet it is not illustrated in any but the more recent books on British birds and so attention is drawn to the series of photographs published in this journal in April 1964 (Ferguson-Lees 1964).

At the end of the nineteenth century the Collared Dove had but a slender foothold in Europe, being restricted to Turkey (Istanbul) and the Balkans (Albania, Bulgaria, Yugoslavia). The present explosive phase of range expansion, perhaps caused, as Mayr (1951: 118) has suggested, by a genetic alteration in the peripheral population, began about 1930 and has been copiously documented. Good general summaries are those by Fisher (1953) and Stresemann and Nowak (1958). Progressing initially via the Danube, Collared Doves arrived in Hungary in 1932, Czechoslovakia in 1936, Austria in 1938 and Germany in 1943, and breeding was reported in north Italy in 1944. The Netherlands were reached in 1947 (but not breeding until 1949) and Denmark was colonised in 1948. Thus the species had exceeded 1,000 miles of north-westerly expansion from the Balkans to the North Sea in under twenty years. In 1949 the first records came from Sweden (breeding 1951) and Switzerland (breeding 1955), and in 1950 from France. The first Belgian record was in 1952 and the first for Norway

in 1954; in both of these countries breeding began in 1955, the same year that the colonisation of Britain can be said to have started.

It is the purpose of the present paper to trace the ten-year history of the Collared Dove in Great Britain and Ireland in its twin aspects, chronological and geographical. I have taken the winter date-line of 31st December 1964 and incorporated all records known to me up to then. Local and regional reports have been examined for records, and many observers have written to me with additional information in response to appeals in *British Birds* and *Scottish Birds* and on the B.B.C. The basically similar Barbary Dove *S. risoria*, a domestic form that does not occur naturally in the wild, is a common aviary bird in this country and escapes are correspondingly regular. Consequently, care has been taken to check the identities of pioneer Collared Doves—that is, those seen away from known breeding areas.

Within the last year or two, as this dove has grown widespread and locally numerous, there has been a tendency—not unexpected—for some observers to become rather casual about the species. I doubt if this has resulted in important records being lost, but it has meant that up-to-the-minute assessments are not always available for areas in which Collared Doves have been resident for some years.

In some parts of our islands, particularly in south-east England, Collared Doves are fast becoming too numerous for all future occurrences to be recorded, and already some county reports have ceased to publish non-breeding records. Inevitably this trend will continue. Fisher (1953: 167) observed that since the Collared Dove began expanding its range from Belgrade about 1930 it had been seen in at least 468 new localities in Europe; it has now been seen in more places than this in Great Britain and Ireland alone.

The spread here is summarised year by year on pages 107-119 and the distribution in individual counties is then detailed on pages 119-129. Figs. 1-8 on pages 108-109 show the colonisation during 1956-63 more graphically on a vice-county basis, while fig. 9 on page 110 brings the picture as up-to-date as possible and also marks the positions of the larger concentrations in 1964.

One final point. The volume of material I have collected is now so large that it is impracticable to quote a reference or even name the observer(s) for individual records. My correspondence and data cards will be deposited with the British Trust for Ornithology.

ARRIVAL AND SPREAD

The first claim that the Collared Dove had arrived in Britain came from Lincolnshire in 1952 (May and Fisher 1953). A male found holding territory at Greetwell Hall, Manton, in July of that year had, according to local evidence, been present since early May. This bird remained in the area for the next six years (at least until 1958), but never succeeded

in finding a mate. The origin of this individual was questioned at the time. Manton was 270-275 miles from the two Dutch localities in which this species was breeding in 1952, and the Collared Dove had made bigger 'jumps' in its spread across Europe. On the other hand, a number of Collared Doves were imported from India between 1947 and 1951, and some passed through the hands of a dealer at Pontefract in Yorkshire, 32 miles and no more than one hour in flight time from Manton; appeals for information on escapes published in the avicultural press proved negative. The editors of *British Birds* (46: 55) concluded that further evidence was needed before the Collared Dove could be admitted to the British List, and this view was endorsed by the Records Committee of the British Ornithologists' Union (*Ibis,* 98: 155).

If the 1952 record could not be accepted outright, no such doubts attended the appearance of the species in East Anglia three years later.

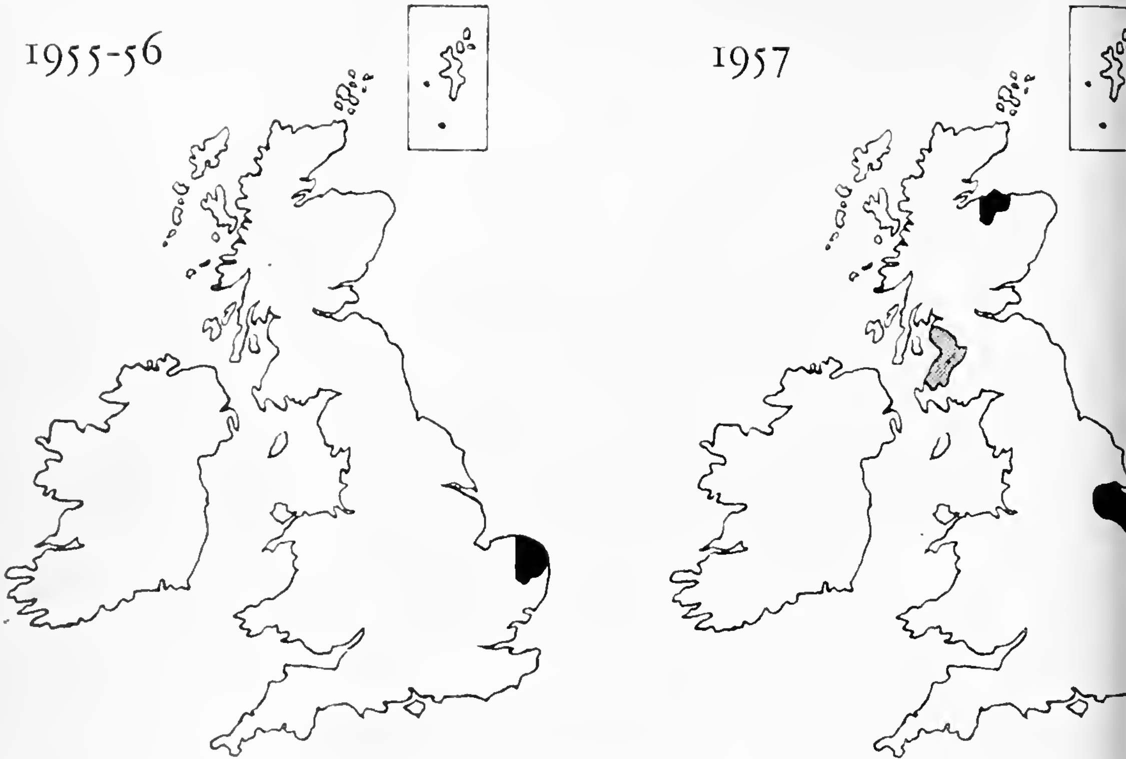
1955

The initial colonisation of **Norfolk,** and thus of Britain, was recorded by Richardson, Seago and Church (1957). One pair of Collared Doves arrived at Cromer (site B in their account) in April, frequented a small garden and reared two young; two birds overwintered here. Though these were not seen by ornithologists until the following year, the 1955 records from Cromer were well authenticated. Less satisfactory was the evidence from Overstrand (site A); it appeared that two or three of these doves were seen by local people, but it was not known whether any nested or overwintered. There was no suggestion that these Norfolk Collared Doves had been imported, and no dealers had advertised any since 1952.

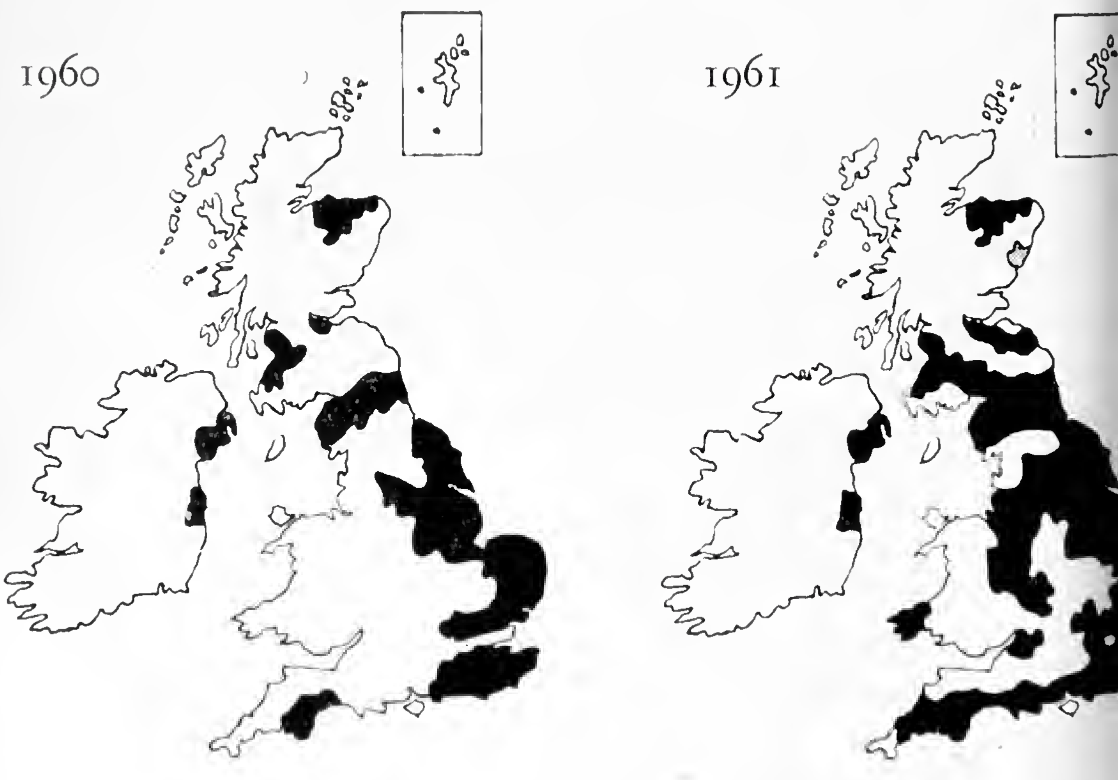
1956

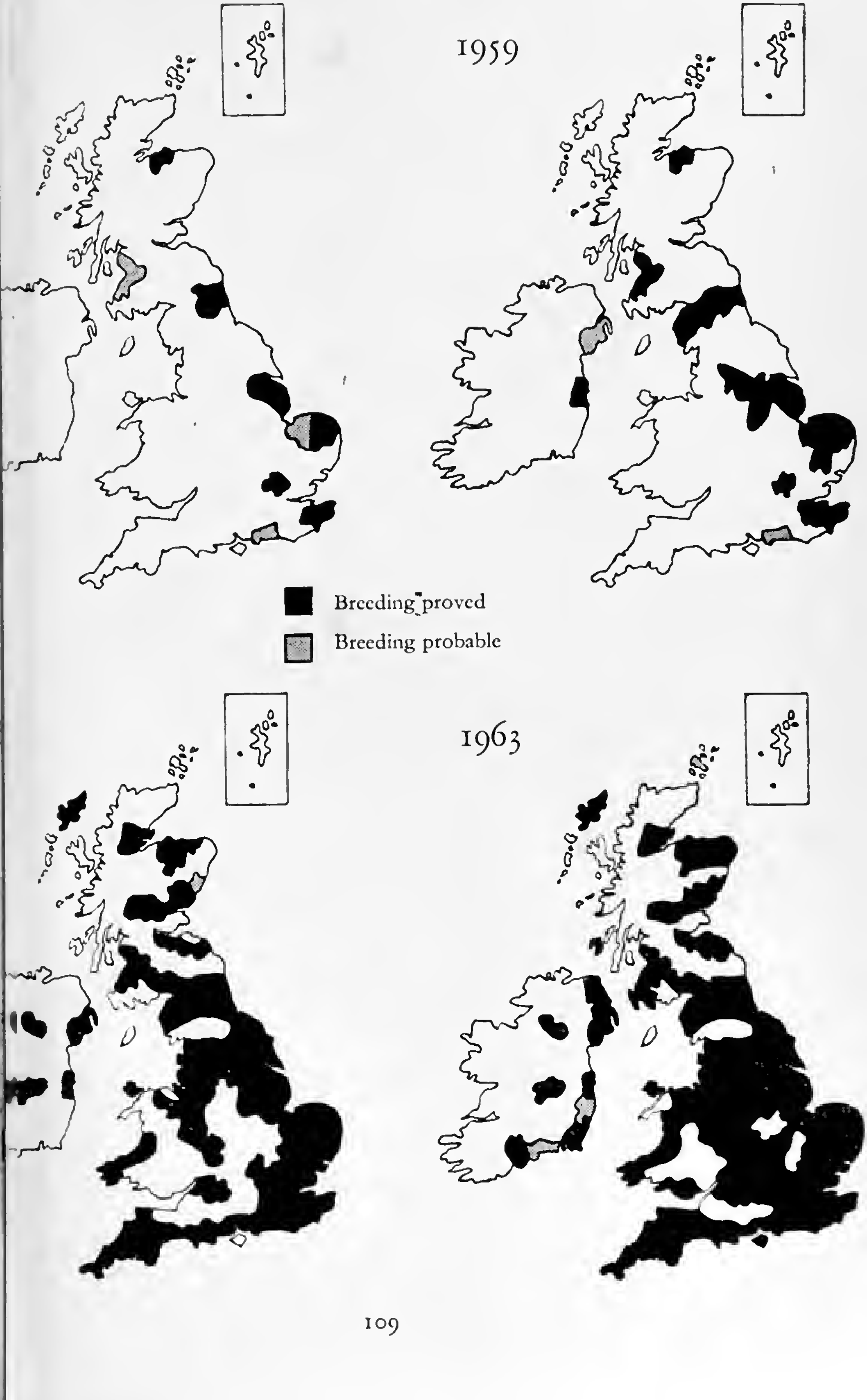
The 1955 **Norfolk** records came to light after the Overstrand birds (now two males and one female) were found by an ornithologist on 3rd July; the known pair had three broods and five young fledged. Near-by at Cromer two pairs nested (sites B and C); three young flew from the known nests. It is certain that at least 16 Collared Doves (including juveniles) were present in the Cromer/Overstrand area by the end of 1956.

Records away from the breeding area were few. In the coastal fringe of north Norfolk, single ones were seen at Cley on 15th August and 9th September (*Brit. Birds,* 50: 242), an adult was photographed at Kelling on 31st October (*Brit. Birds,* 50: 246) and two were seen at Burnham Market, date unknown (*Norfolk Bird Report,* 1957). Two other counties received their first records of Collared Doves in 1956: a male was present at Gomshall in **Surrey** between 6th April and 13th May (*Brit. Birds,* 50: 270); and one was seen at Lakenheath in the **Suffolk** brecks during the summer (Payn 1962: 154).



FIGS. 1-8. Breeding distribution (by vice-counties) of the Collared Dove *Streptopelia decaocto* in Britain and Ireland from 1955 to 1963




1959
Breeding proved
Breeding probable
1963

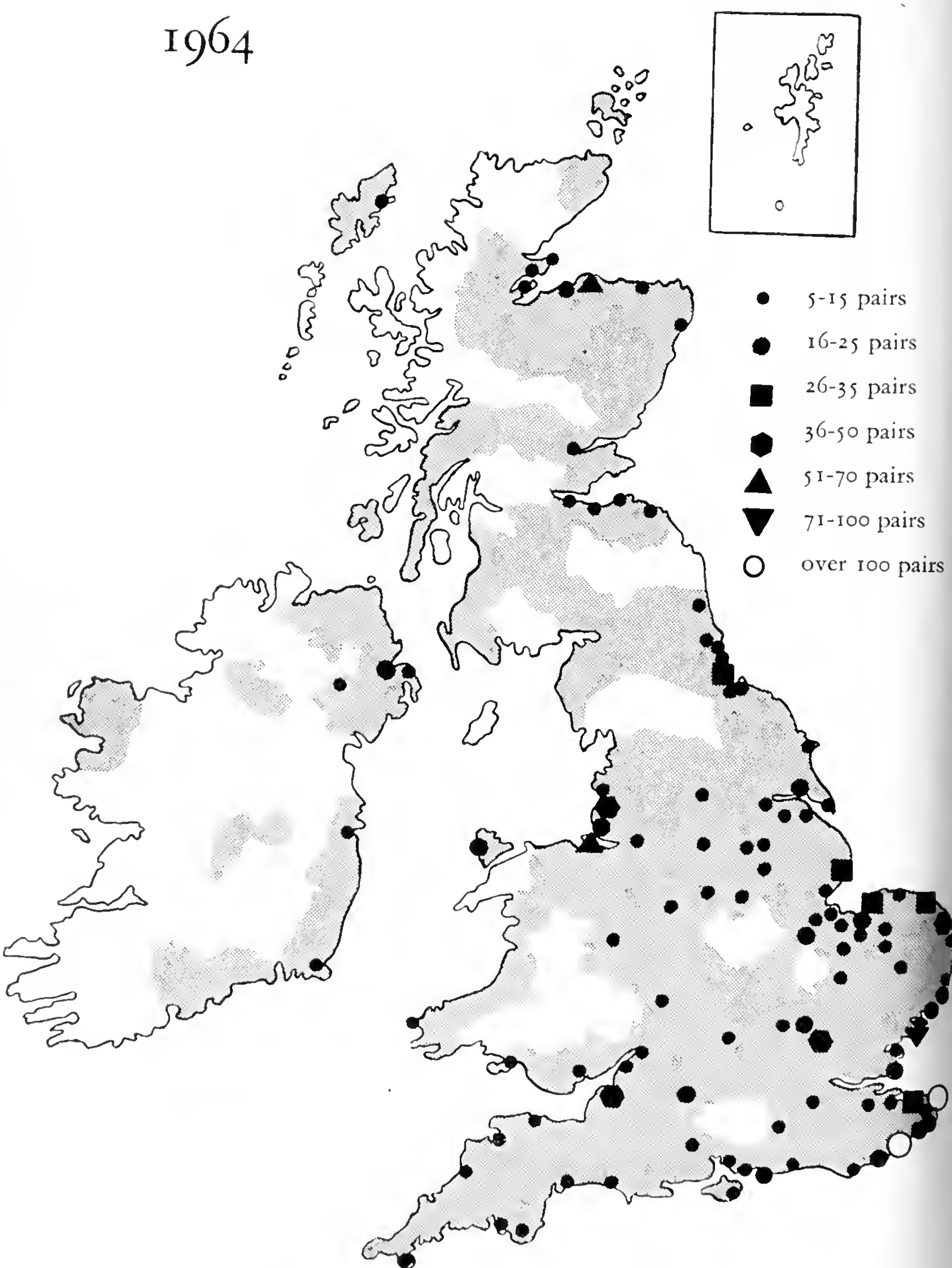


FIG. 9. Breeding distribution of the Collared Dove *Streptopelia decaocto* in Britain and Ireland in 1964. On this map the stippled areas show the vice-counties in which nesting has been proved, while the different symbols mark concentrations of various sizes (see key)

1957 The Collared Dove does not mark time and it was to be expected that 1957 would see some early signs of spread. In fact no fewer than ten counties produced records this year.

In **Norfolk,** probably two pairs bred at Cromer, but it was not known how successful they were; the largest party seen outside the breeding season was five. Four males were calling at Overstrand on 5th June and two pairs nested; here, too, the degree of success was not known, though an unspecified number overwintered. Elsewhere in Norfolk, two were seen at Burnham Market in April and single ones at Burnham Overy on 25th August and North Walsham on 1st October.

Breeding occurred in two additional English counties. A true pair arrived at Manton in **Lincolnshire** (joining the problematical 1952 bird) in May, and their nest (two young fledged) was discovered on 20th June. In **Kent,** single ones were seen near Herne Bay on 16th May and 11th June and at Broadstairs on 1st August; at Staple (near Canterbury) a pair reared two broods and four were still in this area on 20th October, while three fed with chickens at Tilmanstone (three miles south) during December.

An important development in 1957 was the spread of the Collared Dove to Scotland. A pair was found in June at Covesea (near Lossiemouth) in **Morayshire**; their nest, when located, contained one infertile egg and one chick, the latter fledging safely; only two overwintered here. It seems likely that Collared Doves appeared this year at Girvan in **Ayrshire** also, though these birds were not found by ornithologists until 1959.

During this year Collared Doves were noted in five other counties. For the second successive year one summered at Lakenheath in **Suffolk**; and singletons were seen, both on 30th August, at Gosport in **Hampshire** and on St. Agnes in the **Isles of Scilly** (Cornwall). One was present at Rye Meads in **Hertfordshire** on many dates between 22nd July and 3rd September (two on 4th August). An even more protracted stay was made at Tollesbury in **Essex,** where a lone male arrived in May, was joined by a second on 22nd September and the number increased to six by late November.

It is clear that the widespread records for 1957, both breeding and non-breeding, involved more individual Collared Doves than could be the progeny of the original Norfolk colonists. There is no particular reason to suppose that the Scottish birds came from there: Cromer to Lossiemouth is a distance of 375 miles, but from Stavanger in Norway (where these doves began breeding in 1955) to Lossiemouth is only 345 miles, and a journey from Danish Jutland (where Collared Doves had thrived since 1950) is not much further. The inference is that there was fresh immigration from the Continent, and experience in subsequent years suggests that such immigration occurs annually.

1958 Progress was maintained this year, though only three new counties were colonised. For the fourth successive year the species bred in north-east **Norfolk,** with three pairs at Cromer and at least one pair at Overstrand. Other 1958 Norfolk records concerned a pair or two seen (probably breeding) at Hunstanton on the Wash, and two birds seen regularly at Blakeney during November.

There was no proof of nesting this year at Manton in **Lincolnshire** where, however, three birds (additional to the resident 1952 one) were seen on 13th July. In **Kent** there was a considerable increase on the 1957 position, with breeding in at least four localities. One pair reared two broods at Staple and one pair nested at Tilmanstone also. Two pairs bred in Ellington Park, Ramsgate, and one pair did so at Cliftonville, Margate; probably also at Birchington, although this did not come to light until several years later and could not be confirmed. Up to 14 fed on a Margate poultry farm in the autumn. Single birds were seen in six other widely separated Kentish localities; since this year (inclusive) the *Kent Bird Report* has not detailed non-breeding records, the first county report to take this step.

First breeding occurred in two or three new English counties. Two birds arrived at Ponteland in **Northumberland** in June; by September there were four, the additional two being paler, presumed juveniles. All four overwintered; they were not seen by ornithologists until February 1959. One pair bred at Tonwell (near Ware) in **Hertfordshire,** a nest being found there in July. A pair arrived at West Wittering in **Sussex** and subsequently became resident, though they were not brought to the notice of naturalists until 1960; breeding was not proved until that year.

The first **Yorkshire** occurrence concerned two which arrived at Goole sometime during 1958 and stayed; yet another record that did not come to light until a lot later. In **Essex,** the six at Tollesbury in late 1957 had dwindled to three by 16th February and to one by 13th April; there was no evidence that Collared Doves nested there, though singletons were seen in June, July and September and a juvenile was noted at Salcot (two miles away) on 29th July. An individual at Hitcham on 25th April was the sole **Suffolk** report.

In Scotland there was no sign of a spread, but the pair at Covesea in **Morayshire** reared at least four young; seven birds were present in the area on 17th September. At Girvan in **Ayrshire** the two reported in 1957 were still present during the 1958-59 winter.

1959 A year of considerable consolidation and some spread. In **Norfolk** two pairs bred at Cromer and one pair near-by at Aylmerton, and birds were again present at Overstrand (but breeding not proved). Some 5-6 pairs were located at Hunstanton; they are assumed to have bred though proof is lacking. In 1959 the *Norfolk*

rd Report joined that for Kent in ceasing to list all non-breeding cords.

A further increase was apparent in **Kent** this year, especially in the le of Thanet where nests were found at Ramsgate, Birchington, iftonville and Margate. A pair was seen at Staple on 5th February, it there were no reports from Tilmanstone; it is likely, however, that ollared Doves have been resident in both localities since 1957. A ir summered at Deal in 1959 but without proof of nesting. Three or ur adults were present at Cliffe in north Kent between June and ptember, and one pair is known to have bred successfully.

There were no breeding records for **Hertfordshire** in 1959, though e bird was seen near Tonwell on 24th May. The pair at Ponteland **Northumberland** bred again, but two young were killed by a cat; ewhere in this county two were seen at Holywell Dene on 30th May d one or two individuals were noted at Monks' House, near Sea-uses, in June. In **Lincolnshire,** three (one thought to be a juvenile) ere seen at the Manton site, though no nest was found; one pair bred Skegness, a male was shot in Lincoln on 1st June and another was ard near-by at North Hykeham later that month. One or two pairs ere still resident at West Wittering in **Sussex.**

Four more English counties had their first breeding records in 1959. pair located at Anthorn in **Cumberland** subsequently bred. One st was found at Osberton, near Worksop, in **Nottinghamshire,** and n birds (including juveniles) were present there at the end of the year. ne pair nested at Lakenheath in **Suffolk.** In **Yorkshire,** the Goole ir reared two broods in 1959 and three birds overwintered; two ere seen at Chapel Allerton, a Leeds suburb, on 18th April, and gletons at Hull on 7th October and at Fulwood, Sheffield, at the d of the year. Other (non-breeding) English records for 1959 ncern one at Clatterbridge in **Cheshire** on 4th June (the first record the county), one at Walton-on-Naze in **Essex** on 25th September, d individuals in **Cornwall** at Trethewey on 10th June and on St. gnes, **Isles of Scilly,** between 30th September and 11th October.

Records of one or two on Bardsey Island between 6th and 17th ay, and one at Llandudno on 23rd-24th November, were the first not ly for **Caernarvonshire** but for the whole of Wales.

Scotland did not experience any marked alterations in the status of r Collared Doves. The population at Covesea, **Morayshire,** proved be well-established and had spread to Duffus ($1\frac{1}{2}$ miles distant). ere were three at Girvan, **Ayrshire,** when this colony was located 26th May; one nest was found there, and nine birds were present in tober. **Fife** was the only additional county for 1959: one was seen Dunfermline on 23rd August (and for several weeks thereafter), while other singleton was picked up at Methil on 4th October.

Last, but by no means least, 1959 produced the first Irish records.

One pair was found breeding at Glasnevin, a **Dublin** suburb, and another pair summered (but without evidence of nesting) at Comber in **Co. Down.**

1960 This, the sixth year of the Collared Dove's residence in the British Isles, saw a big build-up in numbers in south-east England, together with spread to other areas. To save space and avoid repetition I have not attempted (in the accounts for 1960 onwards) to mention all breeding localities from previous years.

Six more counties acquired resident Collared Doves in 1960. Two pairs bred successfully at Clacton-on-Sea in **Essex,** at least seven young being reared. In **Surrey,** where this species had not been recorded since 1956, a pair nested at Shamley Green, near Guildford. Collared Doves took up residence at Plymouth, **Devon,** during the year and had increased to ten by the autumn. Two pairs bred at Comber in **Co. Down** (the first proven nesting here). The other two counties were in Scotland, and in neither case did the records come to light until 1964. Three arrived and established themselves in the county town of **Banff;** by 1964 there were 25-30 in the area. At least one pair bred at Bo'ness in **West Lothian** (there is local suggestion they may have arrived much earlier, but this could not be confirmed).

Twelve other counties received their first (but non-breeding) records this year. These were **Berkshire** (Cookham, May-August), **Buckinghamshire** (one at Great Missenden and two at Colnbrook, August), **Gloucestershire** (two at Chipping Sodbury, 7th May), **Cambridgeshire** (two at Cambridge, November-December), **Anglesey** (four at Church Bay, 14th May), **Cardiganshire** (two at Llanon in autumn), **Perthshire** (near Pitlochry, 16th February), **Shetland** (Fair Isle, 18th April and 18th June), **Inverness-shire** (Rhum, Inner Hebrides, 5th-7th May), **Ross-shire** (Stornoway, Outer Hebrides, 2nd June), **Aberdeenshire** (heard at Old Aberdeen, 5th June) and **Midlothian** (two at Edmonstone, Edinburgh, autumn).

There was a big increase in the Isle of Thanet, **Kent,** in 1960; by the autumn some 150-180 were present in this small area, more than in the whole of Norfolk! Other new breeding localities in Kent were Deal (five or six pairs) and Hoo on the Medway estuary (one pair). **Lincolnshire** saw spreads to Cleethorpes and Holbeach (one pair at each), while in **Norfolk** one pair summered at Little Cressingham (the first such record for the Norfolk brecks) and two pairs bred at Great Yarmouth. In **Suffolk** seven or eight pairs bred successfully at Felixstowe. Additional **Sussex** localities (single pairs) were Selsey and St. Leonards. In **Yorkshire,** there was good evidence that a pair nested in Hull, two pairs were located at Middlesbrough (one nest found) and others took up residence in the Fulwood area of Sheffield (up to 16 birds in the autumn). The **Northumberland** population

Table 1. Numbers of counties of Britain and Ireland in which Collared Doves *Streptopelia decaocto* had been (a) recorded and (b) proved breeding by the end of 1960

	Total counties	Species recorded	Breeding proved
England	40	20	13
Wales	13	3	0
Isle of Man	1	0	0
Scotland	33	11	4
Ireland	32	2	2
Totals	119	36	19

spread to Gosforth, a suburb of Newcastle upon Tyne (one pair), and to Alnmouth (where up to six birds were seen). In **Morayshire** there was a further spread from Covesea to Gordonstoun, and others arrived at Cluny (near Forres) and at Elgin.

By the close of 1960, Collared Doves were breeding in 19 counties of Britain and Ireland, and had been seen in 17 others (table 1).

1961 A year of very considerable spread, with breeding reported from 15 additional counties. The greatest expansion occurred in England. Single pairs nested at South Hayling Island in **Hampshire** and at Swanage in **Dorset.** In **Cornwall** one pair bred at Bude and two birds remained (without nesting) at The Lizard. Single pairs bred at Shirehampton on the **Gloucestershire** side of Bristol, in **Worcester** and at Cronkhill (Atcham) in **Shropshire.** At least three pairs bred in **Cheshire** (one near Ellesmere Port, two at Wallasey; perhaps at Ness also) and one pair in **Lancashire** (at Ormskirk). Away from the west of England, a nest was found at Marsworth in **Buckinghamshire,** a pair reared young at Littleport in **Cambridgeshire,** and two pairs settled in West Hartlepool, **Co. Durham.**

Increases continued within previously colonised counties. The population on the Isle of Thanet, **Kent,** reached 200 in the autumn, and a spread to Romney Marsh was reported. In **Essex,** the Clacton-on-Sea birds spread to Walton-on-Naze and Frinton-on-Sea, while breeding also occurred in the south of the county, at Thorpe Bay. In **Suffolk** the Felixstowe population rose to about 100 in November, while in **Norfolk** increases were noted at Cromer/Overstrand and at Great Yarmouth. The **Lincolnshire** Collared Doves spread to Grimsby and probably to Boston, and in **Nottinghamshire** two pairs bred at Newark. In **Yorkshire** breeding was proved at Leeds, Easington and Flamborough, and an increase was noted in Sheffield. No new breeding localities came from **Northumberland,** though there was an increase at Gosforth. Non-breeding records that were

nevertheless the first sightings for their respective counties came from **Bedfordshire** (Stagsden, 9th August), **Leicestershire** (Ratby, 12th August) and **Staffordshire** (near Burton-on-Trent on several summer dates and five, including three juveniles, in October). The last-mentioned very probably bred locally though this could not be confirmed (and none was present in 1962). Other non-breeding records for 1961 in England are too numerous to relate.

There were few Welsh records in 1961. The first breeding for the principality took place at St. Davids in **Pembrokeshire** (two pairs) and at Llanon in **Cardiganshire** (one pair). Other records were of one bird at St. Brides in **Pembrokeshire** on 18th April, one at Barmouth in **Merionethshire** in early May, and of one or two establishing themselves (not breeding) at Valley in **Anglesey** in August.

Compared with that in England, the increase in Scotland in 1961 was of modest extent. In **Berwickshire,** one pair nested unsuccessfully at Coldingham and up to twelve birds were seen at Cockburnspath from May onwards. One pair bred at Edmonstone, Edinburgh (**Midlothian**), and another pair apparently did so near **Dumfries** (a juvenile seen). The **Morayshire** colonies (Covesea and Forres) continued to thrive, though that at Girvan in **Ayrshire** disappeared during the 1961-62 winter. During 1961 two birds began regular visits to a garden at Inverbervie in **Kincardineshire** and a male was present during the summer in **Nairn,** where a September nest destroyed in a gale *may* have been Collared Dove's. Neither of these last two records came to light until several years had elapsed.

Ireland remained very much out of the picture in 1961, the sole new record (in addition to the resident pairs in **Cos. Down** and **Dublin**) being of one on Inishtrahull, **Co. Donegal,** on 18th July.

1962

Collared Doves increase on a logarithmic basis: in 1956 they were breeding in just one county, in 1958 seven and in 1960 nineteen; by 1962 they were resident in over 40 counties of Britain and Ireland.

First breeding records came in 1962 from a further two English counties, **Wiltshire** (Marlborough) and **Middlesex** (Heston), one pair breeding at each site. The Middlesex birds may have been there for some time, for a Collared Dove skeleton blown out of a tree during a July gale possibly dated from an earlier year. New county (but non-breeding) records were reported from **Somerset** (five localities, the first at Bishop Sutton, 30th April), **Northamptonshire** (Peakirk, 15th January; Finshade, 2nd May), **Derbyshire** (Youlgrave, May and July), **Oxfordshire** (Woodstock, December) and **Warwickshire** (Ettington, December). Improvements in breeding strength were noted in 20 English counties, but new sites were too numerous to relate in full. However, in view of the predominance of coastal

reeding localities, inland spreads in **Essex, Norfolk** and **Yorkshire** nd increases in **Surrey** and **Nottinghamshire** are especially noteorthy.

In 1962 there were as yet few Collared Doves in Wales. Those at lanon in **Cardiganshire** and St. Davids in **Pembrokeshire** were still esident, as (for a time) were some at Goodwick and Haverfordwest in ne latter county; a pair arrived in the town of Cardigan in September.)ne pair bred at Ruthin in **Denbighshire** and the species was also esident at Valley in **Anglesey** (up to 15 during the 1962-63 winter). here were records from Bardsey Island, **Caernarvonshire,** in May nd September and from four places in **Glamorgan** in May, July and)ctober, while singletons were seen at Llanarth in **Monmouthshire** n 23rd May and at Bodfach in **Montgomeryshire** on 11th June.

One seen on the Calf on 31st May was the first record for the **Isle of Ian.**

Some progress was achieved in Scotland. In **Perthshire** one or two airs bred in the city of Perth, juveniles being seen. In **Ross-shire** a air was present all summer at Stornoway (Outer Hebrides), a nest eing found in October, and on the mainland breeding is thought to ave occurred (juveniles seen) at Invergordon and Tarbat, and perlaps at Kilmuir. There was a report that Collared Doves were umerous at Lennel in **Berwickshire.** In Edinburgh, **Midlothian,** o to twelve were counted at Edmonstone and others at Newington in e autumn. Birds were reported from Dunglass Estate in **East othian** (on the Berwickshire border) early in the year. One pair ested at Arbroath in **Angus.** A singleton was seen on South onaldsay on 23rd July, the first record for **Orkney.**

Ireland, too, fared better this year. Two birds at Tullamore, **Co. ffaly,** in May had increased to eight by the end of the year; breeding as inferred. A nest was built, but no eggs laid, near Enniskillen in **o. Fermanagh** and a pair bred in the additional **Co. Down** locality Annsborough. Two pairs were located in July at Ballinacurra in **o. Cork.** Other Irish records concerned one caught at Donaghadee **Co. Down** in January; singles in **Co. Wexford** on Great Saltee (3rd ay) and at New Ross (three weeks in June-July); and one at Blennerlle in **Co. Kerry** from 3rd September to the end of the year.

963 By the end of this year Collared Doves had been identified in all English counties save only little Rutland, for **London, luntingdonshire, Herefordshire** and **Westmorland** were added in)63. Breeding range extended to include **Berkshire** (Wantage, and erhaps Hungerford), **Oxfordshire** (Islip and Kidlington), **Northampnshire** (Northampton and Peakirk), **Somerset** (Porlock), **Staffordiire** (Hamstall, King's Bromley and Coven Heath), **Warwickshire** outh-west Birmingham) and **Derbyshire** (Spondon).

First indications of nesting came from three more Welsh counties. Pairs bred at Rhyl, Prestatyn and Kinmel, all in **Flintshire.** Two or three pairs were resident at Towyn in **Merionethshire** from the spring onwards, and had increased to twelve birds by December. A resident flock in the Sketty area of Swansea in **Glamorgan** reached 13, also in December. In neither of these last two counties were nests found, though the increases in numbers were circumstantial evidence of breeding. In **Caernarvonshire** three or four birds summered in the county town, but without nesting.

Scottish sight records came from the additional counties of **Sutherland, Roxburghshire, Stirlingshire, Lanarkshire, Renfrewshire** and **Kirkcudbrightshire.** About five pairs nested at Newburgh in **Aberdeenshire,** and one pair did so at Stonehaven in **Kincardineshire.** In **East Lothian** several pairs bred at Aberlady and Gullane. Birds summered and increased at two **Wigtownshire** localities (Garlieston and Portpatrick) and doubtless bred at both. One pair nested on Islay in the Inner Hebrides (**Argyllshire**) where, however, Collared Doves may have occurred the previous year.

In 1963 there was a modest increase in the Irish Collared Doves. Four pairs bred in west Belfast (**Co. Antrim**), and two pairs bred in a new **Co. Down** locality (Bangor). One pair was present at Dungarvan in **Co. Waterford,** but without proof of nesting. In **Co. Wexford** one pair bred in the county town and 15 birds were present there in the autumn. Up to four were seen at Greystones in **Co. Wicklow** on several dates through the year (no proof of nesting). Isolated records came from **Cos. Armagh, Donegal, Londonderry, Kerry** and **Mayo.**

In some English counties, especially those where Collared Doves had been breeding for several years, impressive numbers were being reported. In **Kent** in 1963 there were several hundred breeding pairs in the Isle of Thanet and 250-500 pairs on Romney Marsh. These were by far the largest concentrations, but aggregates of 100 or more birds were reported from Clacton and Frinton in **Essex,** Hitchin in **Hertfordshire,** Felixstowe and Aldeburgh in **Suffolk,** East Runton and Great Yarmouth in **Norfolk,** Skegness in **Lincolnshire,** the Bristol area (**Gloucestershire** side) and Southport in **Lancashire.** In Scotland the largest numbers were to be found in **Morayshire,** with flocks of 60-70 at Covesea and Cluny; by the autumn of 1963 there must have been 250-300 in this county. It is worth stressing that, with the single exception of Hitchin, all these major concentrations were coastal.

1964

Since the next section of this paper is devoted to giving a county-by-county assessment of the present status of the Collared Dove, it would be unnecessary duplication to give much space

Table 2. Numbers of counties of Britain and Ireland in which Collared Doves *Streptopelia decaocto* had been (a) recorded and (b) proved breeding by the end of 1964

	Total counties	Species recorded	Breeding proved
England	40	39	34
Wales	13	10	8
Isle of Man	1	1	0
Scotland	33	29	20
Ireland	32	16	12
Totals	119	95	74

here to the 1964 records. It is sufficient to say that this year produced a large crop of Scottish records, including the first nesting in **Orkney, Caithness, Inverness-shire, Fife** and **Lanarkshire.** Breeding also occurred for the first time in five counties in Ireland (**Cos. Armagh, Londonderry, Mayo, Waterford** and **Wicklow**), one in Wales (**Monmouthshire**) and one in England (**Bedfordshire**). An alert Yorkshireman traced a minor spread to Headingley (Leeds) by hearing Collared Doves calling in the background to a test-match commentary!

The status of the Collared Dove at the end of the present study (31st December 1964) is summarised in table 2.

PRESENT DISTRIBUTION

This section reviews the distribution of the Collared Dove in Great Britain and Ireland in 1964 by means of abbreviated summaries under county headings; emphasis has been placed on breeding distribution. Within the principal divisions (i.e. England, Wales, Scotland, Ireland) the counties are listed in alphabetical order. I believe this arrangement is the most easily followed. To those who would have preferred some other geographical grouping, and in particular to Scots brought up with faunal areas, I freely apologise.

In some instances when nests have not been found, breeding has been inferred from such circumstantial evidence as continued residence associated with increasing numbers or the appearance of juveniles. Frequent reference is made to large feeding flocks; it must be remembered that autumn flocks include juveniles and so reflect the nesting success as well as the size of the breeding population.

Records refer to 1964 unless otherwise stated.

ENGLAND

(40 counties, recorded in 39, breeding in 34)

Bedfordshire. First seen 1961, breeding 1964. Breeding at Bushmead Priory, near Eaton Socon (one pair); also seen regularly at a grain silo in Bedford from April onwards (up to four birds).

Berkshire. First seen 1960, breeding 1963. Breeding at Wantage (one pair); also resident (? breeding) at Hungerford.

Buckinghamshire. First seen 1960, breeding 1961. Breeding at Marsworth (one pair) and Iver (two pairs); also resident at Aston Clinton and Aylesbury (breeding not proved) and one or two birds seen in July in the Beaconsfield-Amersham area.

Cambridgeshire. First seen 1960, breeding 1961. Breeding at Wisbech (five to ten pairs), Littleport, Ely, Cambridge and Great Shelford (three to five pairs at each), at Wilburton (two pairs) and at Elm, Manea, Little Downham, Carlton and Soham (one pair at each). Single pairs also nested at March and Swavesey in 1963, but these areas were not visited in 1964.

Cheshire. First seen 1959, breeding 1961. Particularly widespread in Wirral peninsula where resident at Wallasey (at least 24 pairs), Birkenhead (twelve pairs), Meols, Ness, Ellesmere Port, Stanlow, Bebington and Chester. In east Cheshire, resident in Altrincham and Sale areas; there was a flock of about 60 at Hale (near Sale) in autumn 1963.

Cornwall. First seen Isles of Scilly 1957 and mainland 1959, breeding mainland 1961. V.C.1 (west): breeding at Penzance and near-by at Madron, at Porthgwarra (near Land's End), Lelant and St. Erth (near Hayle); in the Lizard peninsula (one autumn flock of 35) and at Falmouth (one flock of 26) and Redruth; also seen in summer at St. Ives and near-by at Carbis Bay. V.C.2 (east): very few except at Bude where good numbers breeding (at least 50-60 birds); present at Minver (near Wadebridge) in summer 1962, but no subsequent reports. Regular on passage in the Isles of Scilly, but not breeding.

Cumberland. First seen 1959, breeding 1959. Resident at Anthorn (several pairs), Skinburness (up to 13 birds) and Carlisle (two or three pairs). Single pairs also nested at Dearham and Dovenby in 1963, but were not found in 1964.

Derbyshire. First seen 1962, breeding 1963. Breeding at Spondon (three pairs) and Derby (one pair); probably also at Shardlow (up to 24 birds often seen), Pleasley (four, two calling, on 18th October) and Brailsford.

Devon. First seen 1960, breeding 1960. V.C.3 (south): breeding at Plymouth (up to 30 birds), at Kingsbridge and near-by at Kellaton, and at Budleigh Salterton (up to 62 birds); summered at Exmouth in 1963. V.C.4 (north): breeding at Instow (up to 18 birds), Pilton (up to 16 birds) and Bideford (one pair); perhaps also at Knowle (up to 12 birds), at Northam and Fremington (both near Instow) and at Beaford (near Torrington).

Dorset. First seen 1961, breeding 1961. Breeding in the Bridport-West Bexington area (a few pairs resident since 1962), at Portland (three pairs) and at Parkstone (near Poole) and Sherborne (single pairs at each). One pair nested unsuccessfully at Swanage in 1961, but not subsequently.

Durham. First seen 1961, breeding 1961. Breeding at West Hartlepool (25-30 pairs; flock of 201 on 20th October), in the South Shields area (six pairs at Cleadon) and at Sunderland (common with flocks of up to 24); probably also at Norton-on-Tees (some summered and 25 birds in autumn); one pair bred at Darlington. Present at Houghton-le-Side (near Darlington) in 1962-63 winter and one pair apparently bred in 1963, but no subsequent records.

Essex. First seen 1957, breeding 1960. Common along north-east coast between Walton-on-Naze and Clacton-on-Sea (feeding flocks of up to 200); also breeding at Mistley (two pairs), Harwich (at least eight pairs) and Bradwell-on-Sea (several pairs). Breeding in south-east at Thorpe Bay (40 birds in August) and has spread in Rochford Hundred (50 at Great Wakering in September) inland to Rayleigh. Now spreading up the Thames valley and has reached Grays, but still very scarce in

central and west Essex where resident only at Ilford and Buckhurst Hill and in the Shenfield/Hutton area.

Gloucestershire. First seen 1960, breeding 1961. Well-established in north Bristol (30-40 pairs and another pair or two just beyond the eastern boundary of the city; total of about 250 birds in autumn with principal feeding concentration at Avonmouth Docks where up to 200 noted); also resident at Slimbridge (ten pairs in spring, at least 30 birds in November) and Gloucester Docks (feeding flock of up to 53 birds). In north-east Gloucestershire (V.C.33) bred in 1963 at Sherbourne (two pairs) and Coln St. Aldwyn (one pair), but not located in 1964.

Hampshire. First seen 1957, breeding 1961. Breeding on Hayling Island (at least ten pairs) and established at Lee-on-Solent (up to 30 birds), Hill Head and Stubbington; small numbers also breeding at Bournemouth, Christchurch, Barton-on-Sea and Milton near-by, Sway, Totton and Cowplain, and perhaps at Gosport. In north Hampshire, up to five birds seen at Andover in summer. First recorded on Isle of Wight in 1962, now breeding at Ventnor (two or three pairs) and Sandown (flock of up to 40 birds); perhaps also at Shanklin (one or two birds in June 1963 and April 1964).

Herefordshire. First seen 1963. Ten to twelve birds located at Eardisland (near Leominster) in April 1964 were present all summer, but no nests were found and there were no reports of increased numbers in the autumn; thus breeding cannot be assumed.

Hertfordshire. First seen 1957, breeding 1958. Breeding at Tonwell (flock of 37 in August), Digswell (six pairs), Ware (flock of 78 in December), Hertford (flock of 0 in spring/summer), Bramfield (nine pairs), Harmergreen (four pairs), Long Marston (five pairs) and Hitchin (feeding flock reached 105 in December 1963); also present in summer at Lilley and Chorleywood, but breeding not proved.

Huntingdonshire. First seen 1963. One at Holywell on 28th January 1963 and two at St. Ives on 30th April and 13th May 1964 are the only records.

Kent. First seen 1957, breeding 1957. By 1960 some 30-40 pairs were breeding in the Isle of Thanet and there were others nesting at Staple and Tilmanstone (near Canterbury) and at Deal. By 1962 had spread west to Herne Bay and Whitstable and south through Dover to Romney Marsh. By 1964 was resident along much of the coast from Faversham to Dungeness, with extraordinarily large concentrations of at least 1,000 breeding pairs in the Isle of Thanet and 500-800 pairs on Romney Marsh. On the Thames and Medway estuaries, has bred at Cliffe and Hoo (but not regularly). Remains very scarce in central Kent, breeding only at Maidstone (ten pairs). There are far more Collared Doves in Kent than in any other county.

Lancashire. First seen 1961, breeding 1961. Colonised the west coast from the south; still absent from east Lancashire. Present in greatest numbers between Ribble and Mersey estuaries, breeding in the Garston/Liverpool area (two pairs), at Ormskirk and near-by at Aughton, at Formby and Freshfield (three roosts totalled 0 in 1963-64 winter), in the Southport/Ainsdale area (roost in Hesketh Park reached a peak of 220 in December 1964) and at Leyland and Longton (one pair at each). North of the Ribble, breeds only at Lytham St. Annes (32 in one autumn flock) and perhaps at Fleetwood (seen in 1963 and 1964).

Leicestershire. First seen 1961. One at Ratby on 12th May 1961 and two at Oadby in April-May 1964 are the only records.

Lincolnshire. First seen 1957, breeding 1957. V.C.53 (south): breeding at Spalding (several pairs), Boston (ten pairs), Holbeach (four pairs) and Dawsmere (two pairs). V.C.54 (north): breeding in the Skegness area and at Gibraltar Point, Wainfleet and Burgh-le-Marsh, 120 being the largest single flock reported; also at Scanton (flock of 60 in 1963), in the Cleethorpes-Grimsby area and at Gainsborough and Broughton, but no recent figures available.

London. First seen 1963. Reported only from Regent's Park: in 1963 one on 2nd September; in 1964 ten (one party of five) in May, one in June and two in August.

Middlesex. First seen 1962, breeding 1962. In 1963 single pairs nested at Heston, Hounslow and Osterley and a pair was noted from time to time at Cranford. 1964 records are incomplete, but ten birds were seen at Heston in the summer.

Norfolk. First seen 1955, breeding 1955. Four principal centres: (1) the original Cromer area, where breeding from Sheringham to Overstrand (up to 142 birds at the largest feeding concentration at East Runton); (2) the Great Yarmouth/Gorleston area, where at least 30 pairs and spreading to Caister, Winterton, Filby and Mautby; (3) the Hunstanton area, where about 35 pairs at Hunstanton and adjacent Ringstead and two pairs at Holme; and (4) the King's Lynn area, where only ten pairs located but a feeding flock of 110 at West Lynn in September indicates that there are more. A very few pairs also breeding on the north coast at Salthouse, Cley, Morston, Blakeney and Wells. Present at Taverham in summer 1963, but no later report. In central and west Norfolk, breeding at Brandon (about five pairs), Little Cressingham (at least three pairs) and Downham Market (about five pairs), and seen during the breeding season at Swaffham and Seamere and in the East Harling/Bridgham area.

Northamptonshire. First seen 1962, breeding 1963. Resident at Peakirk (seven nests found in 1964; flock of up to 123 in autumn) and Northampton (four pairs).

Northumberland. First seen 1958, breeding 1958. Breeding at Ponteland (one pair), Gosforth (up to 30 birds in feeding flock), Alnmouth (at least four pairs) and Alnwick (two pairs); breeding also suspected but not confirmed in the Holywell Dene/Whitley Bay and Craster/Howick areas.

Nottinghamshire. First seen 1959, breeding 1959. Breeding at Worksop and near-by at Osberton (feeding flock of up to 45 birds), at Newark and near-by at Farndon (feeding flock of 34 birds in 1961, but no more recent figure), at Nottingham (four or five pairs), Radcliffe-on-Trent (24 birds in March) and Egmanton near Tuxford (five pairs), and at West Bridgford, East Bridgford, Beeston and Farnsfield (single pairs at each).

Oxfordshire. First seen 1962, breeding 1963. Breeding at Islip (15 birds in spring) and Kidlington (three pairs); single pairs also summered at Langford (near Bampton) in 1963 and at Chesterton (near Bicester) in 1964, and a flock of up to 31 was present at Sonning Eye in November-December 1963, but no proof of breeding in these areas.

Rutland. Not recorded (the only English county in this category).

Shropshire. First seen 1961, breeding 1961. Breeding at Cronkhill near Atcham (three pairs; flock of 30 in October) and at Ludlow and Wellington (one pair at each); one pair also present in Shrewsbury in summer, but no evidence of nesting.

Somerset. First seen 1962, breeding 1963. Breeding at Porlock (50 birds on 26th November) and Williton (one or two pairs), at Bridgwater (four pairs) and near-by at Dunball (up to 40 birds) and at Weston-super-Mare and Pill (south Bristol) (one pair at each); also seen in summer (? nesting) at Nettlecombe (near Williton), Pawlett (near Dunball), Highbridge and Clevedon.

Staffordshire. First seen 1961, breeding 1963. Breeding at Hamstall Ridware and Haselow Hall (near Tamworth) (three pairs at each), at Coven Heath (two or three pairs) and at Rangemore (near Burton-on-Trent) and King's Bromley (one pair at each); also seen, perhaps nesting, at Stafford, Whittington (near Lichfield), Essington and Blithfield.

Suffolk. First seen 1956, breeding 1959. As in other southern and eastern coun-

-es, the largest concentrations are coastal. Breeding in several places in the Lowes-oft area from Corton to Pakefield (24 the largest flock), at Kessingland, Southwold nd Walberswick (one pair at each), and at Thorpeness (several pairs), Aldeburgh ommon, probably 90-100 birds), Orford (two pairs), Felixstowe (common, over 00 birds), Shotley (a few pairs) and Ipswich (two pairs). Rare inland, the only vo breeding sites being at Lakenheath (two pairs) and Ixworth (at least five pairs).

urrey. First seen 1956, breeding 1960. In metropolitan Surrey, resident at psom (three pairs), Banstead (several sites, 40+ in one chicken run in August), utton (at least three pairs) and Carshalton (one pair); eleven birds also seen at /oodmansterne in August 1963, but not subsequently, and up to six birds fed in a eigate garden in the summer of 1964. Outside the London area, breeding at hamley Green near Guildford (feeding flocks up to 25); also present near-by in 'onersh Park in 1963.

ussex. First seen 1958, probably breeding 1958, certainly breeding 1960. V.C.13 vest): resident at West Wittering (a few pairs), Selsey (15-20 pairs), Middleton (one air) and Littlehampton (up to 30 birds together) and in the East Preston/Ferring rea (several pairs). V.C.14 (east): breeding at Ringmer (one pair) and more com-nonly along the coast between Little Common and St. Leonards (flocks of up to 40); een during the summer at Seaford and Eastbourne and doubtless breeding since up 80 present at Beachy Head in autumn. Ringmer is eight miles inland; otherwise ne Sussex breeding localities are all coastal.

/arwickshire. First seen 1962, breeding 1963. Breeding at Harborne in south-est Birmingham (13 birds in late summer 1964); also present, perhaps nesting, at erry Bar and Edgbaston (Birmingham suburbs), Bartley, Coventry and Ettington.

/estmorland. First seen 1963. Reported only from Appleby: in 1963 three on h May and singles on 12th June and 3rd July; in 1964 two between 19th and 31st lay.

/iltshire. First seen 1962, breeding 1962. Resident at Marlborough (about 20 airs) and Amesbury (three pairs) and in the Salisbury/Coombe Bissett area (several airs).

/orcestershire. First seen 1961, breeding 1961. Resident at Worcester (one air), Sheriffs Lench (one pair), Pershore (one pair), Evesham (three pairs), Kidder-ninster (several pairs) and Spetchley (up to 50 birds).

orkshire. First seen 1958, breeding 1959. V.C.61 (east): breeding at Hull (ten or ore pairs) and near-by at Hessle (three or more pairs), and at Easington (four or ve pairs), Skeffling (one pair), Patrington (two pairs), Lissett (one or two pairs) nd Flamborough (several pairs); also seen in summer (breeding not confirmed) at ve localities near Hull (Howden, Walkington, Skidby, Cottingham, Hedon), at vo near Patrington (Welwick, Weeton), at Hornsea, and at Bridlington and two djacent villages (Sewerby, Rudston). V.C.62 (north-east): breeding at Middles-rough (flock of 35 in spring) and Kirkleatham near Redcar (several pairs); also en, possibly nesting, at Cloughton (near Scarborough), Cropton and Whitby. '.C.63 (south-west): breeding at Goole (two or three pairs and probably also near-y at Rawcliffe and Snaith), in several districts of Sheffield (flocks of up to 16) and : Knottingley, Doncaster and near-by Sprotborough (one or two pairs at each): lso seen in summer at Badsworth, Hemsworth, Ackworth and Walton. V.C.64 nid-west): breeding in several parts of Leeds (flock of 40 at Miles Hill in March); ne pair bred at South Milford (28 birds in December) and others bred near-by at yram cum Poole (flock of 22 in Byram Park in December 1963) and Sutton (near Knottingley, see above). V.C.65 (north-west): not recorded.

WALES (INCLUDING MONMOUTHSHIRE)
(13 counties, recorded in ten, breeding in eight)

Anglesey. First seen 1960, breeding 1962. Breeding at Valley (flock of 58 in spring; 15 pairs bred) and near-by at Four Mile Bridge (two pairs; 25 birds in December) and Llanfwrog (one pair). Lengthy stays recorded in 1963 or 1964 at Hermon (near Bodorgan), Beaumaris and Llangefni, and ten birds at Amlwch in October 1964, but no evidence of breeding in these localities.

Breconshire. Not recorded.

Caernarvonshire. First seen 1959. Often recorded on passage, especially on Bardsey Island. Three or four birds seen regularly at Caernarvon between June 1963 and December 1964, but no evidence of nesting.

Cardiganshire. First seen 1960, breeding 1961. Resident at Llanon (near Aberayron) and Cardigan (fewer than five pairs at each).

Carmarthenshire. Not recorded.

Denbighshire. First seen 1962, breeding 1962. Resident at Ruthin (one pair) and Trevor (near Llangollen) (one or two pairs).

Flintshire. First seen 1963, breeding 1963. Breeding at Rhyl and Prestatyn (numbers not known) and at Kinmel on the Denbighshire border (one pair).

Glamorgan. First seen 1962, breeding 1963. Established in west Swansea (Sketty, Singleton Park, West Cross districts); there was a peak of 29 birds at the favoured feeding site in June.

Merionethshire. First seen 1961, breeding 1963. Resident at Towyn (one nest found; up to 12 birds seen together).

Monmouthshire. First seen 1962, breeding 1964. Resident at Newport (two pairs summered; one known to have bred) and near-by at Bassaleg (flock of 30 in October; breeding presumed).

Montgomeryshire. First seen 1962. One at Bodfach (near Llanfyllin) on 11th June 1962 is the sole record.

Pembrokeshire. First seen 1961, breeding 1961. Breeding at St. Davids (several pairs) and at Goodwick (near Fishguard) and Hodgeston (near Pembroke) (one or two pairs at each); perhaps also at Tenby (up to seven birds). Some summered at Haverfordwest in 1962 (courtship observed) and at Hasguard in 1963, but did not breed at either.

Radnorshire. Not recorded.

ISLE OF MAN

Recorded only on passage on the Calf: single ones on 31st May 1962 and 20th April 1963, and in 1964 at least five between 2nd April and 22nd May and another on 25th September.

SCOTLAND
(33 counties, recorded in 29, breeding in at least 20)

Aberdeenshire. First noted (heard) 1960, breeding 1963. Resident at Newburgh (at least six pairs) and near-by at Tarty (flock of 25 in December), and at Peterhead (one pair); also often seen in summer at Old Aberdeen in 1961 and 1962 (no recent information) and at Fraserburgh in 1964, but no evidence of nesting.

Angus. First seen 1962, breeding 1962. In 1964 one nest found at Arbroath and another near-by at Arbirlot; several birds in the area. One (possibly two) birds at Broughty Ferry in July-August.

Argyllshire. First seen 1963, breeding 1963. In 1964 one pair bred at Campbeltown and up to four birds were present at Southend (both in Kintyre); probably three pairs summered (one nest found) on Islay in the Inner Hebrides. On the island of Iona two birds were seen in autumn 1963 and again in April 1964, the number then rising gradually to 13 in August but dropping again to two by 7th September and breeding not confirmed.

Ayrshire. First seen 1957, perhaps breeding 1957, certainly breeding 1959. The original colony (at Girvan) disappeared during the 1961-62 winter, by which time it involved about 20 birds. Resident at Ayr since 1963 (flock of 15 in autumn 1964); one bird summered at Troon in 1964.

Banffshire. First seen 1960, circumstantial evidence of breeding 1960. Recorded only from the town of Banff where resident since 1960; 45 birds in the main feeding concentration in 1964-65 winter.

Berwickshire. First seen 1961, breeding 1961. Nested at Coldingham in 1961 and two pairs present there in 1964 (but not recorded in 1962-63). Resident at Cockburnspath (up to 12 birds) and across county boundary (see Dunglass, East Lothian). Said to be 'plentiful' at Lennel (near Coldstream) in autumn 1962, but no later reports forthcoming. Up to six birds resident at Duns in summer 1964 (no nesting).

Bute. Not recorded.

Caithness. First seen 1964, breeding 1964. Migrants seen at Lybster, Berriedale and Thurso in May; single pairs nested at Wick and Castle Mey, and three birds summered at Noss Head (near Wick).

Clackmannanshire. First seen 1964. Two at Dollar on 4th August increased to five by October. This is the only record.

Dumfriesshire. First seen 1961, breeding 1961. Resident only in the area of Dumfries, breeding there and three miles away at Carnsalloch (probably 20 birds altogether, 14 being the largest single flock seen). Many non-breeding records.

Dunbartonshire. First seen 1964. One bird at Kilcreggan on several dates between 14th May and 20th June; three in Dumbarton on 22nd July, but only one on 2nd August. These are the only records.

East Lothian. First seen 1962, breeding 1963. Some six to ten pairs on the Dunglass Estate adjacent to the county boundary with Berwickshire; also breeds at Gullane (at least 36 birds in July) and Aberlady (at least 20 birds in July). Up to 15 birds seen at Innerwick during the 1963-64 winter, but not since; in 1964 single pairs seen at Dirleton in June and at North Berwick in early summer, and two or three birds regularly visited a garden at Dunbar.

Fife. First seen 1959, breeding 1964. Single pairs bred successfully at Dunfermline and Crail in 1964; the latter may have been there in 1963; a pair often seen at Leslie between spring 1961 and late 1963, but no evidence of nesting. Many non-breeding records.

Inverness-shire. First seen 1960, breeding 1964. Mainland: one pair bred in Inverness in 1964; also recorded from Rothiemurchus on 2nd July 1961, Fort William on 18th May 1963 and 24th June 1964, and near Gorthleck (Loch Ness) on [illegible]th September 1964. Inner Hebrides: single ones at Kinloch (Rhum) from 5th to 7th May 1960 and at Cleadale (Eigg) on 20th July 1964; one at Upper Duntuilm (Skye) in May 1964 and two there from 4th July onwards. See also Outer Hebrides.

Kincardineshire. First seen 1961, breeding 1963. At least one breeding pair at Stonehaven (eight to thirteen birds in September 1964); regularly visited a garden at Inverbervie between 1961 and 1964 (six birds in January 1964), but no evidence of nesting.

Kinross-shire. Not recorded.

Kirkcudbrightshire. First seen 1963. One on Munches Estate, Dalbeattie, on 27th May 1963. This is the only record.

Lanarkshire. First seen 1963, breeding 1964. At least two males calling at Cambuslang in summer 1964, and a juvenile seen in August. Otherwise recorded only in north-west Glasgow on 20th August 1964.

Midlothian. First seen 1960, breeding 1961. Well-established in the Edmonstone, Newington, Liberton and Granton areas of Edinburgh (24 at Liberton on 20th October the largest flock). Up to three present in July at West Calder, but no evidence of nesting.

Morayshire. First seen 1957, breeding 1957. Well-established in the original area at Covesea (15 to 17 pairs) and has spread to Duffus (16 to 17 pairs), Gordonstoun (ten to twelve pairs), Hopeman (six to eight pairs), Lossiemouth (one pair) and Elgin (several pairs); resident in Forres area since 1960 and a feeding flock at Cluny reached a peak of 67 in early 1963 when concentrated by hard weather; also one pair at Alves (midway between Covesea and Forres). Morayshire is the Scottish stronghold.

Nairnshire. First seen 1961. Up to three in Nairn itself between 1961 and 1963; at least two at Househill (one mile away) in July 1964. No proof of breeding, though a nest blown down in a gale in September 1961 *may* have belonged to this species.

Orkney. First seen 1962, breeding 1964. Mainland: resident since autumn 1963 at Finstown and near-by at Binscarth Wood where a nest with eggs found in 1964 and up to seven birds present later that summer. Shapinsay: present in summer 1963 in Balfour Castle Plantations where apparently a nest built but no eggs laid. Several passage records.

Outer Hebrides (strictly part of Ross and Inverness, and not a separate county, but treated here under this heading for comparison with Orkney and Shetland). First seen 1960, breeding 1962. Lewis: breeds at Stornoway (about five or six pairs) and perhaps at Uig Lodge. South Uist: one or two birds at Grogarry in May and August and at Iochdar in August. Barra: one on 3rd June.

Peebleshire. Not recorded.

Perthshire. First seen 1960, breeding 1962. Resident in Perth itself where 15 birds in 1963-64 winter and 19 in following July; in 1964 one pair also bred at Longforgan and up to 12 birds seen (? breeding) at Balmanno (near Bridge of Earn). Non-breeding records from Comrie, Muthil, Pitlochry, Blairgowrie, Rattray and Aberfeldy.

Renfrewshire. First seen 1963. Six birds at Paisley in November 1963 did not overwinter, but a pair reappeared in June 1964 and stayed; up to three birds resident at Bridge of Weir since June 1963 (courtship behaviour seen spring 1964). No evidence of breeding at either locality.

Ross-shire. First seen 1962, breeding 1962. The original colony at Bindal (Tarbat), where 50 birds in autumn 1963, has spread to Brucefield and Portmahomack; also resident now at Invergordon (two or three pairs), Alness (three pairs), Balavil near Conon Bridge (three pairs), Ethie near Cromarty (a few pairs) and Kilmuir on the Black Isle (three or four pairs). Only two records from Wester Ross: one bird

at Sheildaig in March 1964 and three at Tournaig (Loch Ewe) in July. See also Outer Hebrides.

Roxburghshire. First seen 1963. Two birds at Bonchester Bridge on 27th March 1963. This is the only record.

Selkirkshire. Not recorded.

Shetland. First seen 1960. In 1964 one to three birds were present for over a month at Bixter, a pair summered at Kergord (one bird disappearing in August) and another pair summered at Lerwick (three adults September onwards), but no evidence of breeding in any of these localities. Often recorded on passage (annual at Fair Isle in spring).

Stirlingshire. First seen 1963. Two birds at Killearn between 23rd April and mid-May 1963. This is the only record.

Sutherland. First seen 1963. In the south-east, up to six birds at Dornoch from 7th April to end-June 1964 and occasionally thereafter, but did not breed; one at Golspie on 9th June 1964. In the north and west, single birds at Elphin in June 1963 and near Bettyhill on 10th June 1964; three present near Durness since June 1964, but no evidence of nesting.

West Lothian. First seen 1960, circumstantial evidence of breeding 1960. Resident since 1960 at Bo'ness, where at least 40 counted at a roost. One pair bred at Linlithgow in 1964 and there were eight birds in November.

Wigtownshire. First seen 1963, breeding 1963. Established at Garlieston, where three nests were found in 1964 and a feeding flock reached 16 on 1st October. At Portpatrick a pair summered in 1963 and there were eight birds by November (breeding inferred); no reports from there for 1964.

IRELAND

(32 counties, recorded in 16, breeding in twelve)

Co. Antrim. First seen 1963, breeding 1963. Reported only from Belfast, where well-established: several pairs located in Dunville Park (flock of 75 in November) and one and a half miles away in the area of Cadogan Park (flock of 28 in September); also at least three pairs in the Antrim Road area of north Belfast.

Co. Armagh. First seen 1963, breeding 1964. Two birds seen at Lurgan in December 1963; of five pairs there the following year, two certainly bred and doubtless the others did also; at least 31 birds (many juveniles) present in the area that autumn.

Co. Carlow. Not recorded.

Co. Cavan. Not recorded.

Co. Clare. Not recorded.

Co. Cork. First seen 1962, breeding 1962. Resident at Ballinacurra (two pairs), Ballinhassig (one nest found; eight birds in December) and a Cork City suburb (one pair; a juvenile seen on 4th November). Recorded on Cape Clear Island in 1964 (one on 16th June and two between 22nd and 27th October).

Co. Donegal. First seen 1961. Individuals reported from Inishtrahull (18th July 1961, 29th May 1964, 6th June 1964) and Tory Island (11th-15th July 1963). Two to four birds seen regularly at Keenagh (near Malin Head) between June and September 1964, but no evidence of nesting.

Co. Down. First seen 1959, breeding 1960. Breeding at Comber (seemingly only one pair, though 12 birds in March), Bangor (at least three pairs), Donaghadee (two pairs) and Ballywalter and Annsborough (one pair at each). Three birds seen at

Newtownards in June, three in the Slieve Croobe area in August, and two at Greyabbey in September; no evidence of nesting in these places.

Co. Dublin. First seen 1959, breeding 1959. Established in the north Dublin City suburbs of Glasnevin, Whitehall and Collinstown (population size uncertain but not less than five pairs). Also resident, doubtless breeding, at Baldoyle since 1961 (17 birds in 1964). Three birds seen at Balbriggan in August-September 1964, and a pair present (? nesting) at Portrane (near Donabate) at this time.

Co. Fermanagh. First seen 1962, breeding 1962. Reported only from Thompsons Bridge, near Enniskillen, where one pair has bred since 1962.

Co. Galway. Not recorded.

Co. Kerry. First seen 1962. One bird at Blennerville during September-December 1962, two at Tralee on 11th August 1963, and in 1964 three at Waterville on 2nd June and two at Tralee on 12th September and 1st October.

Co. Kildare. Not recorded.

Co. Kilkenny. Not recorded.

Co. Leitrim. Not recorded.

Co. Leix. Not recorded.

Co. Limerick. Not recorded.

Co. Londonderry. First seen 1963, breeding 1964. Two pairs (one proved to have bred) in Londonderry itself; nine birds present by November. One bird seen at Lough Beg in June 1963, and another singleton present at Downhill during 1963 and 1964.

Co. Longford. Not recorded.

Co. Louth. Not recorded.

Co. Mayo. First seen 1963, breeding 1964. One near Newport in the spring of 1963; three in the same place in May 1964 increased to ten or twelve by September; breeding inferred. Individuals also noted in 1964 at Belmullet on 30th May and near Crossmolina on 1st June.

Co. Meath. Not recorded.

Co. Monaghan. First seen 1964. One pair present at Kilnacloy House, Monaghan, from about May, but there was no evidence of nesting and no more than the two birds were ever seen.

Co. Offaly. First seen 1962, breeding 1962. Known only from Tullamore, where it has nested since 1962. Four pairs are known to have bred in 1964; a feeding flock reached a maximum of 25 in October 1963.

Co. Roscommon. Not recorded.

Co. Sligo. First seen 1964. One at Easky during August. This is the only record.

Co. Tipperary. Not recorded.

Co. Tyrone. Not recorded.

Co. Waterford. First seen 1963, breeding 1964. One pair arrived at Dungarvan in the spring of 1963 and certainly bred in 1964 when a second pair may have done so near-by. Up to six birds present at Dunmore East in 1963 and 1964 (? breeding). One caught near Kilrossanty in autumn 1964.

Co. Westmeath. Not recorded.

Co. Wexford. First seen 1962, breeding 1963. Several pairs have bred in the town of Wexford since 1963 (flock of 15 in October 1963). One bird on Great Saltee on 3rd May 1962 and another present at New Ross for three weeks in June-July 1962.

Co. Wicklow. First seen 1963, breeding 1964. Resident at Greystones (three pairs bred) and near-by at Killinacarrig (one pair). Single birds reported from Avoca in the summer and at Rathnew on 5th September.

ESTIMATING THE TOTAL NUMBERS

How many Collared Doves are there in the British Isles? In table 3 I have produced minimal estimates for each of the ten years from when they were first recorded in Norfolk.

In the early years (1955-57) it was possible to census them, but as rapid increase and expansion have continued so counting has had to be replaced by estimation. The Collared Dove has not yet achieved numerical stability; in other words, the birth rate still exceeds the death rate, as is evidenced by the continued increase and spread. For this reason I have included juveniles as well as adults in my estimates; these estimates, then, refer to peak numbers at the end of the breeding season and before the natural heavy juvenile mortality has taken its toll.

I stress that my estimates are minimal. When a feeding concentration exists I have taken its peak number as being the total for the locality; yet it is unlikely that 100% of a local population would be in one place at one time. Where the population size has been given me in terms of breeding pairs I have allowed four young per pair in my estimates; yet Hofstetter (1954) found a mean of five young per pair in his German study. In those instances where the number of breeding pairs was not specified I have assumed this to be three pairs. Where no information is available for one year for an established colony I have used the figure of the previous year; where there is a gap of several years (an extreme example being the Isle of Thanet in Kent, with 30-40 pairs in 1960 and 1,000+ pairs in 1964, but no figures for 1961-63) I have assumed that the annual increase was at a standard rate and allowed accordingly. There will now be Collared Doves breeding in sites unknown to ornithologists, so widespread has this species become.

Table 3. Minimum estimates of the population of Collared Doves *Streptopelia decaocto* in Britain and Ireland, 1955-64

'N England' and 'S England' are divided by a line from the Severn to the Wash, with the counties of Lincoln, Leicester, Warwick and Worcester included in the northern part and Northampton and Gloucester in the southern

	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
S England	4	16	35	80	130	490	1,270	3,590	7,810	14,545
N England	–	–	5	10	40	100	400	720	1,610	2,565
Wales	–	–	–	–	–	–	20	45	95	270
Scotland	–	–	5	10	25	70	185	260	580	1,115
Ireland	–	–	–	–	10	15	25	35	105	360
Totals	4	16	45	100	205	675	1,900	4,650	10,200	18,855

Table 4. Numbers of localities in which Collared Doves *Streptopelia decaocto* were resident in Britain and Ireland, 1955-64

'N England' and 'S England' are divided by a line from the Severn to the Wash, with the counties of Lincoln, Leicester, Warwick and Worcester included in the northern part and Northampton and Gloucester in the southern

	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
S England	1	2	3	10	15	32	59	104	177	230
N England	–	–	1	3	9	15	36	62	100	144
Wales	–	–	–	–	–	–	3	7	15	25
Scotland	–	–	2	2	3	9	16	24	38	76
Ireland	–	–	–	–	2	2	3	7	12	26
Totals	1	2	6	15	29	58	117	204	342	501
% increase		100	200	150	93	100	102	74	67	46

It will be seen that the minimum total of Collared Doves in Britain and Ireland in 1964 was 18,855 birds (of which, incidentally, nearly 10,000 were in Kent). As these estimates were based on the assumption that each pair rears four young per year, so the totals will consist of about one-third adults and two-thirds juveniles. An annual mortality of 14% of adults and 40% of juveniles is tentatively suggested on the basis of survival data published by Hofstetter (1954); as yet there is no comparable British study. If the German figures are applicable to British Collared Doves (though this is likely, it should not be taken for granted), then by the onset of the 1965 breeding season the 18,855 will most probably have dropped to approximately 13,000. However, to this latter figure must be added the uncertain quantity (probably to be reckoned now in hundreds rather than tens) of new immigrants from the Continent. It is likely that such immigration is largely responsible for the big build-up in the south-east (especially in Kent) in the last few years.

It is difficult to assess the annual rate of increase. The Thanet example previously cited indicates that the figures in table 3 should not be used for this purpose. An alternative is to take the more precise figures obtainable for the number of localities in which Collared Doves were known to be resident each year. These are given in table 4. The samples for 1955-57 are small and that for 1964 may be incomplete, but between 1958 and 1963 inclusive the rate of annual increase *in number of sites* ranged from 67% to 150%, a mean of 98% per year.

Fisher (1953: 167) quoted Keve (1944), which I have not seen in the original, to the effect that in Hungary between 1932 and 1943 the number of Collared Dove localities increased by about 30% per annum (falling after 1943). Mathiasson (1962: 422), summarising the first twelve years (1949-61) of the Collared Dove in Sweden, estimated there were 1,200 in that country in the 1961-62 winter. A recent

analysis of the increase in the Netherlands has been made by Leys (1964: 256): after ten years of residence (1949-58) there were approximately 600 breeding pairs. Of course, the Netherlands is a small country, one-ninth the size of the British Isles. An area of comparable size in south-east England (east of a line from the Wash to Sussex, but including Bedfordshire and Buckinghamshire) held approximately 1,150 breeding pairs after a similar ten-year interval (1955-64). Not until the thirteenth year did the Dutch population reach this size.

It is thus certain that the rate of increase of the Collared Dove in the British Isles has been greater than in Hungary and Sweden, and that in south-east England (only) the increase has been more rapid than in the Netherlands. It seems that the species is destined to increase quickly in our islands.

DISPERSAL

The Collared Dove is apparently resident (save for local feeding movements) in established breeding areas, yet a proportion of the population will move great distances to colonise new areas. In this way the species has spread the 1,500 miles from Belgrade to the Outer Hebrides in only 30 years. It is conjectured (but not proved) that established breeding adults are for the most part resident and that young birds are mainly responsible for the spread to new areas. Although immigration from the Continent is believed to occur annually, there are at present only three recoveries of ringed birds. Two of these came from Herford in German Westphalia: a juvenile ringed in July 1961 was caught near Perranporth, Cornwall; in June 1962; and an adult ringed in December 1963 was found dead at Sunderland, Co. Durham, in November 1964. The third recovery was of one (age unknown) ringed at Barneveld (Gelderland) in the Netherlands in January 1964 and found injured the following September at South Benfleet, Essex.*

Having been impressed by the preponderance of spring dates among records of non-breeding birds (especially at the bird observatories) I have made an attempt at ascertaining the timing of dispersal. For this purpose I have divided the records into the following seven categories, of which A to F relate exclusively to occurrences in non-breeding areas:

A those from northern and western bird observatories (Fair Isle, Calf of Man, Hilbre Island, Bardsey Island, Skokholm, Lundy, St. Agnes, Saltee, Cape Clear and Tory Island)

B those from eastern and southern bird observatories (Isle of May, Monks' House, Spurn Point, Walberswick, Sandwich Bay, Dungeness and Portland, but excluding Gibraltar Point, Cley and Selsey because of resident populations in those areas)

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*At the time of going to press, it is learnt that another Dutch-ringed Collared Dove was recovered at Lytham St. Annes, Lancashire, in January 1965; this had been ringed as an adult at Wageningen (Gelderland) in February 1964. The total of foreign-ringed ones found in Britain is thus now four.

C those from English and Welsh counties in which nesting had not at the time been recorded
D those from non-breeding areas in English and Welsh counties where nesting had been recorded
E those from Scottish and Irish counties in which nesting had not at the time been recorded
F those from non-breeding areas in Scottish and Irish counties where nesting had been recorded
G those from likely or proved breeding areas where the dates of initial arrival are known with confidence (actually less than one-fifth of the total)

From the monthly totals in table 5 it can be seen that, for every category, May has the largest number of records followed by either April or June. A possible source of bias must be mentioned: males sing more in spring and will thus be more readily located; this may reflect in category G in particular (though not at all in categories A and B). However, it is quite clear that there is more movement in the three months April-June than at any other time of the year. For each category I have calculated χ^2 to test the preponderance of spring records; in all cases they are statistically significant at the level $P < .001$.

The figures for category G in table 5 are my only direct evidence that spread and colonisation principally occur in the spring, while the figures for categories A to F show seasonal mobility in keeping with this hypothesis. It is noticeable that at the permanent feeding sites there is a progressive build-up in numbers during the summer and autumn, as juveniles appear, and a marked decline (i.e. dispersal) in spring (see, for example, the counts for East Runton, Norfolk, on page 133). Autumnal records in table 5 must not be ignored, however, and these include a few from isolated spots (such as bird observatories and a lightship) that cannot be local dispersal. Nevertheless, there is no doubt that autumn movements are on a very much smaller scale than those for the spring.

Table 5. Records of Collared Doves *Streptopelia decaocto* in Britain and Ireland, 1955-64, distributed to show timing of movement

Categories A-G are explained on pages 131-132. For the purposes of this table, any party has been counted as a single record and, when the bird or birds concerned have stayed on, only the first date has been used

Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
A	–	–	1	8	36	14	2	2	4	11	1	–
B	–	–	13	25	46	18	7	21	16	10	–	–
C	2	–	2	11	22	7	10	10	6	2	2	2
D	7	3	11	59	91	29	31	26	34	33	13	10
E	2	1	2	6	28	19	6	4	6	1	–	–
F	–	–	1	5	10	5	1	1	1	3	–	–
G	1	2	12	14	37	19	2	3	2	–	–	1
Totals	12	6	42	128	270	111	59	67	69	60	16	13

PLATE 21. Long-tailed Skua *Stercorarius longicaudus* standing by its eggs, Sweden, June 1966 (pages 139-145) (*photo: J. B. and S. Bottomley*)

PLATE 22. Long-tailed Skua *Stercorarius longicaudus* on its nest, Sweden, June 1960: note the pale grey upper-parts, the well-defined cap, the 'clean' cheeks and breast, and the long tail-streamers (pages 142-144). Below, the habitat of this pair: a stony fell with scant vegetation (page 140) (*photos: J. B. and S. Bottomley*)

PLATE 23. Light and dark Arctic Skuas *Stercorarius parasiticus*, Shetland, June 1964, for comparison of colour, build and tail-length with Long-tailed: even the light phase has darker upper-parts, a less clear-cut cap, pectoral shading, a paler bill and, of course, a shorter tail (pages 143-144) (*photos: D. A. P. Cooke*)

PLATE 24. Above, Arctic Skua *Stercorarius parasiticus* (left) and Long-tailed Skua *S. longicaudus* in flight, Orkney 1946 and Finland 1958, to show differences in tail-length, wing-shape and build (pages 142-144) (*photos: Eric Hosking*). Below, a Long-tailed Skua standing on an intruder, U.S.S.R. (page 140) (*photo: L. A. Portenko*)

HABITAT, FEEDING AND FLOCKING

A factor which has facilitated the recording of the Collared Dove's spread is its close association with man. This trait is far from being peculiar to the British population; it has been commented on by many authors writing of Asian as well as European Collared Doves.

Throughout the British Isles the species shows a marked preference for human habitation and is perhaps more at home in the parks and gardens (even churchyards) of towns and villages than in open farmland. Large private gardens with ample nesting cover, typically with cypresses *Cupressus* or pines *Pinus* of good height, are especially favoured. For example, most of the 1,000+ pairs in the Isle of Thanet (Kent) are concentrated in town gardens and parks, with just a few on peripheral farmland. It cannot be denied that the Collared Dove is an attractive addition to the avifauna of urban and suburban gardens, where substantial numbers may build up when food is regularly distributed for them.

Like all the European Columbidae, the species is granivorous. It is familiarly associated with poultry, especially where hens are kept on open range. That this can be an important source of food, particularly in built-up areas, is illustrated by a Surrey example: a small flock fed in an open chicken run at Carshalton during the 1961-62 winter, but all disappeared in April when the hens were removed. The first Nottinghamshire Collared Doves were attracted by grain spread during the rearing of Pheasants *Phasianus colchicus*. Large flocks may be found where grain is used (as at corn-mills and maltings) or spilled (as at docks). Good examples of the former exist at Worksop and Newark in Nottinghamshire, and of the latter at Avonmouth Docks in Gloucestershire. Feeding on agricultural land may become more widespread as the species increases, but at present this is principally a feature of the late summer and autumn when stubble fields are the attraction. Some fresh green food is consumed and there have been complaints of damage in gardens, especially to brassicas and lettuce.

Though strictly territorial in the immediate vicinity of the nest, concentrations at favoured feeding sites (gardens, granaries, poultry runs and so on) will persist throughout the year. Many examples of these could be given. One of the largest is at East Runton in Norfolk where Collared Doves are concentrated in a private garden by regular feeding: in 1964 the monthly maxima here were 110 in January and February, 136 in March, 108 in April, 95 in May, 73 in June, 71 in July, 110 in August, 116 in September, 121 in October, 142 in November and 127 in December. Peak numbers at these feeding sites generally occur in autumn when the maximum numbers of juveniles are present; death during the winter and emigration in spring serve to reduce the level, which is at its lowest during the early summer.

Flocks assume a more permanent character in autumn. Communal

roosting is a regular feature outside the breeding season. Obviously these roosts build up and dwindle gradually. One such roost (in willows on an island in a lake) in Hesketh Park, Southport, Lancashire, held 50 on 21st October 1964 and had increased to 220 by 16th December. A much smaller one (in ivy choking a tall hedge) at Long Marston, Hertfordshire, did not disperse in 1964 until 17th May; it will be remembered that the spring of 1964 was a cold one and the breeding season was retarded as a consequence.

BREEDING

As yet there is little information on the breeding biology of the Collared Dove in Britain. The B.T.O. Nest Record Scheme has 20 cards for this species; for a further 120 nests incomplete details (dates being particularly scarce) are available. In this paper I shall confine my notes to the timing of the breeding season and to nest-site preferences.

The Collared Dove has an extended breeding season. Table 6 shows the monthly distribution of the 95 nests for which dates of finding are available. Data for all years have been lumped because of the small annual samples. The May 'peak' is doubtless more apparent than real, arising from a willingness to record first nests but not subsequent ones; thus nine nests were found in Anglesey on 11th May 1964, but there was no later search. Further, for nearly two-thirds of these 95 nests the stage of development was not reported. In short, table 6 shows that the breeding season may extend over ten months of the year, but no other conclusions should be drawn at present.

Table 7 records the observed sites of 140 nests, height above ground level being known for 77 of them. It will be seen that cypress and pine are preferred when available. In addition to the figures given in the table it is reported in general terms that most nests at Penzance and Bude in Cornwall are in cypress (the dominant local tree), as is the case at Felixstowe in Suffolk (where they have also been found in pine and elm *Ulmus*); and at Tarbat in Ross-shire they are in sapling spruce *Picea*. Since the Collared Dove is an adaptable species, nest-site preference will vary from area to area according to what is available. In Anglesey, where trees are scarce, nests have been found on out-buildings and in old nests of the Rook *Corvus frugilegus*. For obvious reasons the height of nests will vary according to situations: the lowest recorded were two at five feet in blackthorn *Prunus spinosa* and the highest was

Table 6. Monthly distribution of 95 nests of Collared Doves *Streptopelia decaocto* in Britain and Ireland

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
–	–	4	11	30	13	14	9	6	5	2	1

7. **Recorded nest-sites of Collared Doves *Streptopelia decaocto* in Britain and Ireland**

	Height in feet							Unknown height	Total
	1-5	6-10	11-15	16-20	21-30	31-40	41-50		
chestnut *ulus hippocastanum*	–	–	–	3	1	–	–	2	6
orn *Crataegus*	–	2	5	1	–	–	–	2	10
Sambucus nigra	–	3	–	–	–	–	–	3	6
lmus	–	–	3	–	3	–	–	1	7
Ilex aquifolium	–	–	–	–	–	1	1	5	7
Fagus sylvatica	–	1	1	2	1	–	–	1	6
deciduous	2	3	1	1	1	1	–	12	21
s *Cupressus*	–	–	–	1	6	–	–	9	16
Pinus	–	–	4	9	5	3	–	6	27
: *Picea*, Firs *Abies*, h *Larix*	–	3	2	–	–	–	–	8	13
conifers	–	–	1	–	–	–	–	3	4
s	–	–	–	–	–	–	–	2	2
nder	–	1	–	2	3	–	–	9	15
otals	2	13	17	19	20	5	1	63	140

deciduous: lime *Tilia* (6), blackthorn *Prunus spinosa* (3), ash *Fraxinus* (2), walnut *Juglans* (2), sycamore *Acer pseudoplatanus* (2), birch *Betula* (1), English maple *Acer campestre* (1), apple *Malus* (1), plum *Prunus* (1), sweet chestnut *Castanea sativa* (1), plane *Platanus* (1)

conifers: yew *Taxus* (2), Lebanon cedar *Cedrus libani* (1), monkey-puzzle *Araucaria araucana* (1)

s: cotoneaster *Cotoneaster* (1), rhododendron *Rhododendron* (1)

nder: exteriors of buildings (5), insulators of telegraph poles (4), ivy *Hedera helix* on tree trunk (3), old Rook *Corvus frugilegus* nests (3)

at 50 feet in holly *Ilex aquifolium*. All things being equal, the preferred height seems to be between 15 and 30 feet.

The usual clutch is two eggs (exceptionally three) and each pair may nest several times a year: four nests in a season are commonplace and five have been recorded. In north-west Germany, in fact, Hofstetter (1954) found the average to be five broods per pair, from which an average of five young per pair were reared. Some mortality estimates based on Hofstetter's data were given on page 130; he considered that the mortality among young Collared Doves was appreciably less than in related species. It is self-evident that a high degree of breeding success, coupled with low mortality, is required to provide excess birds for extensive expansion of range.

PLUMAGE VARIATIONS

As noted in the introduction to this paper, the Barbary Dove is a common aviary bird in this country and escapes are by no means infrequent. I have been told that a feral colony is now breeding at Leighton Moss in Lancashire, as others have done in southern England

(Fitter 1959). Typically, the Barbary is a much more buff and less grey bird with pale brown instead of blackish primaries; there is a completely white variety known as the 'Java Dove'. Much cross-breeding in captivity between species of *Streptopelia* has resulted in impurity among captive stocks of Barbary Doves.

The Collared and Barbary Doves are probably conspecific and so it is hardly surprising that several British colonies of the former have been joined by one or two escaped Barbary Doves. Neither is it surprising, in view of the impurity of many Barbary Doves, that the resulting crosses have produced some striking individuals. These variants fall into two principal categories:

(1) *Brown plumage.* Several birds in the flock at Clacton (Essex) have been of varying shades of buff and brown, while three at Hitchin (Hertfordshire) were described as noticeably creamy. All these individuals were at once distinguishable from Barbary Doves (present at both places) by their retention of the dark primaries which are typical of the Collared Dove; the black half-collar was present, as in both parent forms. Similar buffish birds with blackish primaries and half-collars have also been seen at Southport (Lancashire), Epsom (Surrey) and Llanon (Cardigan). The presence of dark primaries in all such brownish variants induces confidence in their parentage.

(2) *White plumage.* White, or almost white, birds have been seen in five sites; all of these retained the black half-collar though their primaries were white. Individuals that were pure white (apart from collars) have been reported from Lee-on-Solent (Hampshire), Sandown (Isle of Wight), East Runton (Norfolk) and Cluny (Morayshire). Others described as white flecked with a few brown feathers (still with collars) have been seen at Lee-on-Solent, Sandown, East Runton and Shenfield (Essex). It will be seen that three localities had both white and almost white ones. Only one locality had more than two such birds, this being Sandown where a flock of 40 in 1964 included six white ones, three almost white ones and two Barbary Doves. It is not possible to say which of these whitish variants were the result of crosses between Barbary and Collared Doves and which were direct escapes from captivity.

THE FUTURE

We have seen that by the end of 1964, just ten years after the first arrivals nested in Norfolk, Collared Doves were known to be resident in 501 localities in Britain and Ireland (while scattered non-breeding records had come from over 400 more) and that the total population was estimated to be at least 18,855. One cannot fail to be impressed by the rapidity of this colonisation and there is no reason to suppose that

the rate of increase will be reduced in the near future. Many counties have only a few breeding localities and so there is ample room for expansion. For thirty years the Collared Dove has been moving north-westwards across Europe, but it has now reached a major barrier, the Atlantic Ocean. Colonisation of the Faeroes and Iceland is possible, but, if Continental stocks continue to move north-west (as must be expected), it is likely that the next ten years will see a very big build-up in Britain and Ireland of birds unable to move any further.

At the present time the Collared Dove is for the most part welcomed as an attractive addition to our avifauna, yet continued immigration from the Continent must inevitably produce pest status here (at least locally). Already the first rumblings have been heard. The greatest concentration at present (1,000+ breeding pairs) is in the Isle of Thanet, in Kent, whence D. C. H. Worsfold writes:

'It would be true to say that they have now reached pest proportions in Thanet, and many people are already using the ominous word "control". They nest in every available type of tree along main roads and side streets, and the boarding-house keepers complain that their persistent calling in the early morning is a continual source of annoyance to visitors to the town. Poultry breeders say that they are costing them a small fortune in meal, which they take from under the noses of the fowls.'

Complaints about noise have come from elsewhere in Kent and also from Lancashire; gardeners in Hampshire, Hertfordshire and Norfolk have spoken of damage to plants; while poultry keepers in Norfolk and Surrey have expressed concern at the amount of corn taken from their hens. It is known that Collared Doves have been illicitely shot as nuisances in Surrey, Kent and Norfolk. So far, their preference for urban and suburban areas has avoided a clash with agricultural interests, but future high density may alter this. It is pertinent to mention that it has recently been found necessary to reduce numbers at Harderwijk, one of the first Dutch sites (S. Cramp *in litt.*).

We who can remember the British and Irish List as it was in 1952 may feel reluctant to accept the prospect of control measures being sanctioned against the Collared Dove; future generations may well place the species on a par with the Woodpigeon *Columba palumbus*.

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POSTSCRIPT. When this paper was in proof, two additional 1964 nesting localities came to light: a pair which bred at Tralee in **Co. Kerry** brought the total of counties in which nesting is known to have taken place to 75 (see pages 119 and 128) and one or two pairs also bred at Sleaford in **Lincolnshire** (see page 121).

Studies of less familiar birds

133. Long-tailed Skua

By D. G. Bell

*Photographs by J. B. and S. Bottomley, Eric Hosking, L. A. Portenko and D. A. P. Cooke**

(Plates 21-24)

DISTRIBUTION

THE LONG-TAILED SKUA *Stercorarius longicaudus* is by far the rarest of the four species of skuas off the coasts of the British Isles. Yet it nests no further away than the Hardanger Vidda in south Norway, on virtually the same latitude as Shetland, and from there northwards in a wide belt embracing the highest parts of the Norwegian and Swedish mountains. North of the Arctic Circle it extends eastwards through Finnmark—the breeding headquarters in Europe outside Russia—and continues right across the northern edge of the Eurasian tundra, including the arctic islands. The Nearctic race *pallescens* (which has been recorded in the Outer Hebrides) breeds from north Greenland and Ellesmere Island south to the shores of Hudson Bay, extending west to Alaska and east to Labrador. The distribution of the species is thus circumpolar. Besides reaching further north than any other skua, the Long-tail extends below the Arctic Circle in several parts of

*Dr. D. A. P. Cooke's photographs of light and dark phase Arctic Skuas *S. parasiticus* (plates 23a and 23b) are included for comparison.—EDS.

its range. Indeed, on the west coast of the Bering Sea it nests on the same latitude as southern England.

Such a wide distribution gives a misleading impression of actual numbers, however. In the breeding season this skua is largely dependent for food on the various species of lemmings *Lemmus* and *Dicrostonyx*—creatures with notoriously fluctuating populations—and Løppenthin (1943), among others, has established a close correlation between its breeding cycle and theirs. Taking records from Greenland, Finnmark and Novaya Zemlya, he showed that in seven instances peak numbers of breeding Long-tails and full clutches coincided with lemming maxima (which occur about every four years), while in 25 cases no Long-tails at all nested in years of lemming minima. That there are only five breeding records from Spitsbergen is at least partly due to the complete absence there of lemmings and any other endemic rodents; adult Long-tails are often seen and the terrain is apparently ideal, but the only rodents are a few accidentally introduced mice and rats in the mining settlements.

Because of this dependence on lemmings, the Long-tailed Skuas south of the Arctic Circle are very irregular breeders. Even where the populations are densest, in the far north, the individual pairs nest further apart than do other skuas. Virtually no counts are available, but the tentative average total advanced by Merikallio (1958) of 1,500 pairs in Finland seems too high (as he himself admitted), particularly as the species does not nest south of the Arctic Circle in that country.

BREEDING

In Europe the breeding grounds are exposed, stony fells or tundra, with scant vegetation (typically lichens, crowberry *Empetrum* and dwarf birch *Betula*), at altitudes varying from sea-level to 4,000 feet, but in Finnmark mostly between 200 and 400 feet. There is usually water or swampy ground close by, though the actual nest-site is dry. A typical habitat is shown on plate 22b.

The birds arrive in late May or early June, but the times of arrival and egg-laying vary greatly according to the weather. The clutch usually consists of two eggs (though often only one) laid in a scantily lined depression in the ground. Both sexes share incubation duties, one on guard while the other sits. The young hatch after about 23 days, leave the nest in two days and depend upon their parents until at least ten days after flying.

Intruders of any kind are mobbed, sometimes determinedly, but this species is, on the whole, less demonstrative and aggressive than its relatives. When the nesting-area contains more than one pair, neighbouring birds may participate in such demonstrations or at least show their curiosity. There are several cases of a photographer working with one of these graceful birds standing on his head (plate 24c).

MIGRATIONS

It is not the very variable numbers of Long-tailed Skuas nesting in Europe which make them rare off British coasts, but their migration routes, and our knowledge of these is incomplete.

Odd ones do pass along British shores and those on the east coasts of England and Scotland are likely to be of Fenno-Scandian origin, but such occurrences are decidedly uncommon in autumn—and almost unknown in spring. Five experienced sea-watchers of my acquaintance have seen a combined total of seven Long-tails, out of thousands of other skuas, in the last ten to 18 years of regular watching on the north-east coast of England, mainly at Hartlepool (Co. Durham) and Spurn (Yorkshire). It is unthinkable that if most of the European population used the North Sea they would not be recorded more often, particularly at the bottleneck of the Straits of Dover. High altitude migration, possibly by some overland route, has been suggested, but the scattered and isolated records inland in Europe offer very unconvincing evidence of this. (The incidence of inland records is rather high by comparison with those of other skuas, but the actual number is still very small and may merely reflect the comparative weakness of this species in stormy conditions.)

In fact, it is likely that most European Long-tails pass between Iceland and the Hebrides, far out to sea, and join those from Greenland and eastern North America to fly down the mid-Atlantic. Such a route is, in fact, direct, if one accepts the hypothesis that the species winters off the southern coasts of South America. It must be more than coincidence that, apart from exceptional instances of exhausted, wind driven flocks clearly off course (Nelson 1907 gave a dramatic account of the many seen on the east coast during the famous gale of October 1879), the central and western Atlantic is one of the only areas where big numbers of migrating Long-tails have been recorded. There steady northward movement in settled weather in May has been observed by, for example, V. C. Wynne-Edwards (writing in Bannerman 1963). It is also significant that the north-west coasts of Ireland have provided over half of the few spring records in the British Isles and that Swedish and Finnish birds arrive from the west over the north Norwegian mountains, not from the Baltic. On the American side of the Atlantic, spring records extend from the Tropics to the Arctic.

In winter Long-tails desert the northern hemisphere and are then presumed to be far out to sea off the southern coasts of South America, perhaps with *pallescens* predominating on the west side and *longicaudus* on the east. Wynne-Edwards (in Bannerman 1963) quoted the observations of A. Wetmore and H. H. Beck who saw thousands in this area in winter. The paucity of such records is doubtless due to the decidedly pelagic existence of this species out of the breeding season and to the confusion between it and the Arctic Skua *S. parasiticus* after

the autumn moult, when the Long-tail's diagnostic tail streamers are lost and dark streaking appears on the breast.

FEEDING

The food in the breeding season is very different from that in the rest of the year. In the short Arctic summer, as already stated, lemmings are the staple diet. Other rodents may also be taken then, but birds figure very sparsely. Although, for example, buntings *Emberiza spp.* are sometimes caught, the skuas often take a playful rather than a gastronomic interest in these fellow inhabitants of their breeding-grounds; waders such as Turnstones *Arenaria interpres* and Purple Sandpipers *Calidris maritima* are rarely molested, though their chicks are on occasion. On the other hand, insects and their larvae, crustacea, worms and vegetable matter (particularly crowberries) are freely taken and the young are fed on such items to a large extent during their first few days of life. Insects are caught in straight pursuit or by soaring.

Away from the breeding-grounds the sea supplies the food, but Long-tails are less piratical than the other skuas. (Some experienced observers have even doubted whether they ever chase gulls and terns, but they certainly do so sometimes.) They hawk to and fro low over the water with languid flight reminiscent of ponderous marsh terns *Chlidonias spp.,* picking up floating offal, and they will also accept such offal thrown to them from fish-quays, retrieving it by hovering, up-ending or wading (Bell 1964). Incidentally, they also hover when seeking out lemmings from their holes. Carrion is taken freely.

IDENTIFICATION

Many reports of Long-tailed Skuas are the result of misidentification. Too few observers are sufficiently aware of the considerable variation in the Arctic Skua's body size and tail projection. It therefore seems worth giving the main characters of the Long-tail in some detail.

Adult

The most striking feature of the adult is the pair of excessively long central streamers (plate 24b) which typically project up to nine or ten inches beyond the other tail-feathers (themselves graduated). Besides being so long, these are remarkably flexible, moving independently of each other and even curling backwards at times. When the bird is hovering, the tips vibrate violently as though made of rubber. These feathers, however, may project as little as 6½ inches even when fully grown, whereas those of some Arctic Skuas extend to as much as 4½ or 5 inches beyond the rest of the tail; they may also have been bitten off by other skuas, while young birds do not grow them fully until about their third year and adults moult them every autumn.

When present, these streamers, together with the slender body and neck, give the bird a characteristic 'elongated' look which is often a surer guide in identification than its build. Undoubtedly it is typically lighter than the Arctic, but individual variation in size demands great caution. The popular idea of the Long-tail's 'tern-like' appearance can be exaggerated, and refers as much to its feeding methods described above as to its build—which, though slender, is by no means frail. Small Arctics approach Long-tails in bulk (just as big ones may come near to Pomarine Skuas *S. pomarinus*) and the sight of a small pale-phase Arctic Skua with tail-streamers of extreme length, particularly just after some heavy dark-phase immatures have passed by, has misled many an unwary observer.

The Long-tail's wings, though thinner than those of other skuas, are still substantial; the outer edge of the hind part is convex, or paddle-shaped, thus preventing the tapering effect usually characteristic of a tern. The wing length can be striking, particularly in relation to width, producing a difference from the Arctic which is discernible to a practised observer, though only really conspicuous when seen from below (*cf.* plates 24a and b)—a view not usually obtainable of passage birds.

In normal flight the slighter build of the rarer species gives it a comparatively buoyant action with a rather shallow wing-beat, but, again, direct comparison with a tern would be misleading, for there is no noticeable 'bounce' of the body on the down-stroke. Unfortunately, Long-tailed Skuas are most likely to appear when gales are blowing and then the slight difference in flight action is lost, all skuas either labouring heavily into the wind or streaking along with it.

In general coloration the adult Long-tail approximates to the pale-phase Arctic Skua. (A dark phase of the Long-tail has been described, but is apparently known only from juveniles and is very rare; for all practical identification purposes, only the light phase need be considered.) A basic difference is that the back, mantle, rump, base of tail and wings are noticeably paler and greyer, affording greater contrast with the blackish cap and the dark hind border to the secondaries (*cf.* plates 21 and 22a with 23a). Instead of the shafts of all the outer primaries being white, only those of the outermost two are. Despite the inference in some standard text-books, this does not mean that this is the only paleness on the wing: underneath there is often a pale area (varying considerably, but quite extensive on some, probably sub-adult individuals) formed by the whitish bases to the vanes of the primaries, palest where these join the under wing-coverts, which may themselves be tipped with whitish. In addition, when the spread primaries are seen from below against a bright sky, a pale subterminal 'flash' is visible across them; this is due to the light shining through that part of each primary which is not either too dark—the tip—or

overlapped by the next one (plate 24b). The upper surfaces of the outer primaries show palish webs, but much less extensively than those of a typical Arctic Skua. It must be noted, however, that in the latter species the shaft of the fourth primary is sometimes also brownish and the wing flash inconspicuous: the distinction is not therefore conclusive.

The blackish forehead and crown extend further down the nape, and tend to look darker and more sharply defined (plates 21 and 22a). The pale collar round the neck and on the cheeks is usually a deeper straw-yellow, and almost always wider. The chin, throat and breast are whitish, without the dark pectoral band often present in the Arctic Skua (but the latter may have much paler cheeks and neck than the one on plate 23a). In the European race the deep dusky grey of the under tail-coverts usually (but not always) spreads beyond the belly and sometimes as far as the breast, forming a more conspicuous and extensive dark area on the under-parts than in the Arctic Skua and making the whiteness of the upper breast and collar correspondingly more obvious. This dusky shade on the under-parts also spreads upwards on to the flanks and sides of the breast as a progressively fainter wash. The beak is thinner and usually shorter, and is all black; the tarsus is grey and the tibia, joints, toes and webs are black. In the Arctic Skua, only the end of the beak is black, while the legs and feet are completely so. The sexes of the Long-tailed Skua are similar, but females average larger, with longer tails.

Immatures

The sequence of plumage changes from juvenile to adult is variable and incompletely known. The bird of the year is a colder, greyer brown than the similar but darker and richer plumage of the Arctic Skua. The pale edges and tips to the upper-parts are ashy (not rich buff or rusty) and, being wider, form heavier barring. The upper breast and throat are streaked brown, as in the Arctic, but at least sometimes these streaks do not extend so far down: the lower breast and belly are often very pale. The flanks, axillaries, under-wing and under tail-coverts are more heavily barred than those of the Arctic. In the hand, or at exceptionally close range, the rectrices can be seen to have rounded tips, as opposed to the spiked tips of the Arctic's (the text illustration in Witherby *et al.* 1941 hardly shows this at all). This distinction (which also applies to the outer three primaries) is valid for the first and second years only (Walter 1962). The third-year bird has predominantly ash-grey upper-parts, breast and flanks. The barring and pale tips to the feathers become less conspicuous with age, and the under-wing darker, and by the fourth summer the only traces of immaturity are some barred or pale-tipped axillaries, under wing-coverts and tail-coverts. The young Arctic has greyish legs with the distal portion of the webs black,

as in the Long-tailed, but the distinctions concerning build, flight and the white primary shafts are the same as in the adults.

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Notes on the summer food of the Kestrel in northern Ireland

By J. S. Fairley and A. McLean

THE KESTREL *Falco tinnunculus* is perhaps the most common member of the Falconiformes to be found in the British Isles and, as such, its prey in England has been the subject of a number of papers, notably those of Ellis (1946), Davis (1960) and Simms (1961). However, very little information exists as to its food in Ireland, where a number of the smaller mammal species commonly taken in Great Britain are absent. The results of the analyses of a number of pellets collected in Cos. Antrim, Tyrone, Armagh and Dublin during the summer of 1964 are therefore of interest.

The sites and dates of collection are given in table 1 where it can be seen that, with one exception, all the pellets were obtained from nests or from the ground beneath them. Feathers and other animal remains not in pellet form but clearly associated with the nesting sites were also collected and taken into account in the final estimate of the proportions of prey.

Pellets and pellet fragments were separated from the debris of twigs, droppings, bones and feathers, dried on a hot plate and weighed. They were subsequently divided into smaller batches each of about 10 grams and these were examined in turn before a composite estimate was finally made.

The identifications of the mammal species present were made from teeth and from cross sections of hair. The latter were prepared by the cork method of Stoves (1957). It may be mentioned here that the identification of such sections is greatly facilitated by the relative

paucity of potential mammal prey species in Ireland. In some cases the fur had undergone digestion to the extent of being practically unrecognisable. Unfortunately it is impossible to allocate the remains of feathers from pellets to even the major avian taxa. Some indication of the species of birds eaten was, however, obtained from wings which were sometimes recovered in and around the nest.

The form of the pellets has already been adequately described by Davis (1960). They are much more compacted than any owl pellets examined here and contained relatively fewer skeletal remains. The average dry weight of a single pellet was about 0.7 grams. From this it can be seen that the total mass of 294 grams examined comprised approximately 420 pellets.

The results of the analysis of the material, together with the dry weights of the individual batches, are shown in table 1. The method of recording the abundance of each prey in each batch was to use a series of indices: 1 (present), 2 (small proportion), 3 (moderate proportion) or 4 (large proportion). This is not entirely quantitative, but it is not really possible to estimate the relative amounts of the prey taken more accurately. No readily identifiable portion of the skeleton of small mammals seems to be invariably present and thus absolute numbers of prey species cannot be given. Any emphasis on 'numbers of pellets containing prey item' gives a false impression of accuracy as pellets vary greatly in size and in weight.

The results obtained are fairly consistent and can probably be relied upon to give a reasonable indication of the food of the Kestrel in northern Ireland. From them it is quite clear that, during the summer at least, this hawk subsists mainly on small birds (probably particularly immature Starlings *Sturnus vulgaris*) and Field Mice *Apodemus sylvaticus*, and to a lesser extent on other small mammals including House Mice *Mus musculus*, Brown Rats *Rattus norvegicus*, Lesser Shrews *Sorex minutus* and Rabbits *Oryctolagus cuniculus*.

Confirmatory evidence has been supplied by Thompson (1849) who examined the gut contents of four Irish Kestrels. These included bird, Rabbit and insect remains (mostly *Geotrupes* and *Carabus*). A more recent account was that of Deane (1962) who stated that he observed an adult Kestrel taking prey to nestlings in a local conifer plantation. This food included two Field Mice, one House Mouse and one young rat, as well as birds, a newt and a frog. These two records are therefore quite compatible with the findings in the present study.

The aforementioned work in England by Ellis (1946), Davis (1960) and Simms (1962) relied mainly on skeletal characteristics of the prey, from which it is not always possible to give an exact identification if teeth are absent. It is, however, quite clear from their work that the chief prey taken was the Field Vole *Microtus agrestis*, with much smaller percentages of birds and other small mammals. As voles are as yet

Table 1. Abundance of various prey items in pellets of Kestrels *Falco tinnunculus* from seven sites in northern Ireland in summer 1964

The abundance of each prey in each batch is expressed as 1 (present), 2 (small proportion), 3 (moderate proportion) or 4 (large proportion); the reasons for this are explained in the text. With the exception of those from site 1, all the pellets were obtained from nests or the ground below; all the nests were in conifer plantations, except that at site 4 which was in an ivy-covered ash tree. The dates given for sites 1 and 4 are those on which the pellets were received from L. Nesbitt and F. W. Fox respectively; all the other batches were collected by the authors. Scientific names of mammal prey species are given in the text. The insects were mostly beetles of the genera *Geotrupes* and *Carabus*. At three sites the presence of other prey remains suggested the bird species involved: at site 3 there were 35 wings, mostly of immature Starlings *Sturnus vulgaris* but including at least one Blue Tit *Parus caeruleus* and one Yellowhammer *Emberiza citrinella*; at site 4, 25 wings of immature Starlings and one headless Starling (also one Field Mouse); at site 5, one wing of an immature Starling

Site number and locality	Date	State of nest	Weight of pellets	Field Mouse	House Mouse	Lesser Shrew	Brown Rat	Rabbit	Birds	Insects
(1) Castledillon, Richhill, Armagh	7th May	–	11 gm.	4	2	–	–	2	4	1
(2) Mullinsallagh, Portglenone, Antrim	12th June	Contained eggs	7 gm.	4	–	3	–	–	3	–
	15th July	Young flew out	43 gm.	4	–	–	3	–	2	–
(3) Killygarin, Toomebridge, Antrim	19th June	Young in area	57 gm.	4	–	3	–	–	4	1
(4) Whitestown, Tallaght, Dublin	5th June	Young in area	18 gm.	3	–	–	–	–	4	–
(5) Aughnahoy, Portglenone, Antrim	17th July	Deserted	73 gm.	4	2	–	2	–	4	1
(6) Eden, Ballymoney, Antrim	31st July	Deserted	29 gm.	4	–	–	–	–	4	1
(7) Ballygawley, Tyrone	1st August	Young in area	56 gm.	4	2	–	2	–	2	1
Total batches containing prey item				7	3	2	3	1	7	5
Percentage batches containing prey item				100%	43%	29%	43%	14%	100%	71%

unrecorded in Ireland it would seem that the Kestrel makes use of the other two most abundant sources of food 'normally' taken. The ecological picture is, however, probably more complicated than this as Uttendörfer (1952) stated that in Germany, where many more species of small mammals are present, the Field Mouse is again the most important prey.

It is interesting to note that the Field Mouse is supposedly almost entirely nocturnal. It has, however, periods of activity around dusk and dawn with, in fact, peaks at these times in winter (Miller 1955).

These facts make it rather difficult to explain why Field Mice are such a regular item in the diet of this diurnal predator in Ireland unless the bird is particularly adept at catching the few individuals which are abroad during the day. However, Thompson (1849) '. . . remarked the kestrel abroad at a very early hour in the winter morning; and Mr. Poole notes his having observed one on the morning of the 11th of November before 7 o'clock when there seemed little enough light for an owl to plunder'. If Kestrels can hunt at fairly low light intensities it is possible that many of the Field Mice eaten are caught around dawn and dusk.

ACKNOWLEDGEMENTS

We are grateful to Louis Nesbitt and F. W. Fox for material which they very kindly forwarded and also to C. D. Deane for identifying some of the avian prey from wings. Finally, thanks are due to Professor R. A. R. Gresson for facilities provided in the Department of Zoology at the Queen's University of Belfast.

SUMMARY

Collections of pellets of the Kestrel *Falco tinnunculus* were made in northern Ireland during the summer of 1964 and analysed for prey content. They contained mostly the remains of Field Mice *Apodemus sylvaticus* and birds. Wings collected around some nests suggested that the latter were mainly immature Starlings *Sturnus vulgaris*. House Mice *Mus musculus*, Brown Rats *Rattus norvegicus*, Lesser Shrews *Sorex minutus* and Rabbits *Oryctolagus cuniculus* were also eaten, together with beetles (*Geotrupes* and *Carabus*).

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Notes

anx Shearwaters and other sea-birds as prey of Peregrines and olden Eagles.—The following observations may be of interest in ew of the recent note by A. J. Gaston (*Brit. Birds,* 57: 466-467). On th September 1964, at about 2,000 feet on Hallival, Isle of Rhum, I w a Peregrine *Falco peregrinus* eating a Manx Shearwater *Procellaria ffinus.* As I approached, it left the carcase which proved to be a eshly killed young bird with down still attached to the under-parts; rt of the breast had been eaten. Shearwaters breed on all sides of allival from about 1,500 feet to the top (2,365 feet). I have also often en shearwater remains at Peregrine plucking places on the coastal ffs of Rhum, while in August 1960 Phillip MacRae reported putting a Peregrine from Welshman's Rock and finding more than six fresh earwater kills.

Manx Shearwaters are no less frequently taken by Golden Eagles *quila chrysaëtos* on Rhum. Castings and samples of food collected om accessible eyries in 1958, 1960, 1962 and 1963 all contained shear-ater remains. In 1960 the eaglet in one eyrie very close to the breed-g colonies was fed mainly on adult shearwaters; in the early spring, hen there has sometimes been a high mortality amongst the shear-aters in the colonies, Golden Eagles have been seen feeding on ones hich have obviously been dead for some time, but it is not known w the large number of shearwaters carried to this eaglet were taken.

Other sea-bird remains recorded in Golden Eagle eyries on Rhum ve included Herring Gulls *Larus argentatus* (1957, 1960 and 1962), ittiwakes *Rissa tridactyla* (1957, 1960, 1962 and 1963), Guillemots *ia aalge* (1963), Fulmars *Fulmarus glacialis* (1963) and Shags *Phala-corax aristotelis* (1964). In 1957 one eaglet was reared on a diet nsisting largely of young Herring Gulls, and in 1963 Fulmars were e main food of another. On 15th August 1963 the eyrie vacated by e latter eaglet was inspected and found to contain many sea-bird mains including the corpses of twenty full-grown Fulmars: some of ese had been partly plucked and the breasts of a few had been eaten, t most were intact. On 20th March 1964 a number of pellets and her food remains were collected from a favourite roosting place of olden Eagles and from an eyrie on the north side of the island: these ere kindly analysed by Ernest Blezard and the samples from both es proved to contain the remains of Shags. P. Wormell

[Letters on the subject of Peregrines preying on Manx Shearwaters pear on pages 153-154.—Eds.]

Observer mobbed by adult Cuckoo when approaching juvenile.—In mid-June 1962, on the Pentland Hills, Midlothian, I saw a juvenile Cuckoo *Cuculus canorus* being fed by a pair of Meadow Pipits *Anthus pratensis* in a gorse bush near the edge of a deciduous wood. After a few minutes I approached to within 30 feet, whereupon an adult Cuckoo flew towards me from the wood. It swooped to within six feet of my head and then returned to a tree in the wood, all the time uttering a loud and excited call which might be described as something between a chatter and a chuckle. I then noticed a second adult Cuckoo near-by in another tree; this bird was making the same noise—which, according to Dr. D. A. Bannerman's *The Birds of the British Isles* (1955, 4: 127), appears to be one that is uttered by males only.

The first Cuckoo flew at me three more times, almost as if trying to protect the juvenile, which had moved only a few feet during this time. However, when the latter flew about 200 yards away both adults went off together for a similar distance in the opposite direction, one of them uttering the characteristic *cuc-coo* of the male, and there was no further reaction from them when I approached the juvenile again. The behaviour of the Meadow Pipits was not noted. A. PAUL BELL

Lesser Spotted Woodpecker attacking galls.—On 3rd January 1965, near Colchester, Essex, we saw a male Lesser Spotted Woodpecker *Dendrocopos minor* flying low along a thick hedgerow. It alighted momentarily on a dog-rose *Rosa sp.* and then flew to another. There, from a distance of about 30 feet, we observed it attacking a gall with tit-like postures and acrobatics. After about ten minutes it flew off and we found that the gall had been opened and the larva removed. In fact, over 30 galls in the immediate vicinity had been similarly treated and it seemed clear that this particular woodpecker was in the habit of feeding on the grubs inside them. Since then we have found many other galls opened in this way in an area of several square miles. A. K. WOOLSEY, G. E. EVANS and B. FROST

Numbers of Magpies preying on a roost of Tree Sparrows.—In August and September 1964 I made regular visits to a marsh of *Phragmites* reeds in the old course of the river Ebro about 22 miles north-west of Zaragoza in north Spain. This marsh is about 500 yards long and 100 yards wide. Each evening large congregations of Magpies *Pica pica* used to gather in olive groves and wet fields adjoining the north side of it. Chattering parties assembled from all points of the compass and settled both in the trees and on the ground. It was hard to assess their numbers, but a conservative estimate suggested that about 250 were present by dusk.

The marsh was also the roosting place of several hundred Tree Sparrows *Passer montanus*. The first of these used to appear roughly

half an hour before sundown. Invariably they gathered to the east of the marsh and flighted en masse in a straight line to the centre of the reeds, thus by-passing the area where the Magpies were. A maximum of about 1,200 Tree Sparrows was involved, though the numbers had dropped to some 800 by early September (incidentally, 80 were trapped and ringed). They were very noisy and they seemed to roost near the bases of the reeds, which were up to seven feet high.

At dusk there was great activity. Small bands of Magpies, six or seven strong, sallied forth from the olives and plunged into the reeds. Clouds of Tree Sparrows erupted in confusion. The Magpies seemed clumsy and inefficient, but when one was successful in catching a Tree Sparrow it retired to the trees or some outlying rocks to consume it. I had the impression that at least some of the Magpies carried the sparrows in their feet, but I could not be sure of this in the poor light; certainly they used their feet to clamp the corpses against branches or rocks while they pecked at them. By no means all of the Magpies engaged in this behaviour: a maximum of 60 was involved in any one evening and by half an hour after sunset all was usually quiet. The predation inflicted was not great, but the method certainly seemed original. The size of the concentration of Magpies was also extraordinarily large, although Prof. F. Bernis informs me that flocks of 100 or so are not uncommon in Spain. R. L. Rolfe

Female Blackbird catching newts.—Towards the end of May 1964 a pair of Blackbirds *Turdus merula* built a nest in our porch at Claygate, Surrey. One day when the nest contained eggs my husband and I saw the female Blackbird go to the pond in our garden and cock her head as though listening for sound or looking for movement under the water. She then splashed or dived into the pond and reappeared with a newt which she killed by banging it on the ground before flying off with it in her beak. This became a regular habit and later, after her eggs hatched, she would fly straight from the pond to the nest with a newt in her beak, presumably with a view to feeding it to her two young. All the newts were some four to five inches long. The young disappeared before fledging, but the catching of the newts went on. On one occasion I was cleaning the pond and was called away. When I returned I found the blanket weed strewn round the garden and the Blackbird pulling it apart looking for newts. When she tired of the pond she would come quite close to me when I was digging in the garden and would take worms inches from my hand. The last I saw of her was in early July when I had to go away for about three weeks.

J. Atkinson

[Mrs. Atkinson has kindly sent us two photographs of the Blackbird with a newt, but unfortunately these are not suitable for reproduction.—Eds.]

Bullfinch nesting in reeds over water.—In June 1961, near Swindon, Wiltshire, I was surprised to find the nest of a pair of Bullfinches *Pyrrhula pyrrhula* in a small reed-bed at the edge of a lake. This was constructed normally of fine twigs lined with black root fibres, but being built around three or four reed-stalks and about three feet above the water it was in a site more suitable for Reed Warblers *Acrocephalus scirpaceus*. The Bullfinches successfully reared a brood of four.

G. L. Weyman

Bullfinch nesting in sedges over water.—On 5th June 1963, at Southill Lake, Bedfordshire, with Dr. Bruce Campbell and D. W. Elliott, I found the nest of a pair of Bullfinches *Pyrrhula pyrrhula*, containing three eggs, in what seemed a most unusual situation. It was built in a tussock of sedges no less than nine feet out from the edge of the lake and two feet above the water. Being a typical structure of small twigs lined with rootlets and hair, it looked quite out of place. Bullfinches were very common in Southill Park at that time and we found three other nests in normal sites on the same day.

I. J. Ferguson-Lees

Review

Portrait of a Desert: The Story of an Expedition to Jordan. By Guy Mountfort. Illustrated by Eric Hosking. Collins, London, 1965. 192 pages; 68 plates (11 in colour) incorporating 116 monochrome and 26 colour photos; 8 line-drawings and a map. 36s.

This is an account of the expedition of many talents which Mr. Mountfort led to Jordan at the invitation of King Hussein in the spring of 1963. Jordan's conservation problems are all too familiar in an age when human pressure is bearing more and more heavily on natural resources. The larger mammals have been almost completely exterminated by indiscriminate shooting (with shameful assistance in the past by British soldiery). Running parallel with this has been the destruction of natural habitats, with the felling of woodlands by man and the clearing of desert scrub by both man and the all-devouring goat. This, coupled with inefficient land husbandry, has accelerated the process of soil erosion and, if this is allowed to continue, the point will soon be reached where the land is incapadle of supporting the human population, swollen as it has been by so many refugees from old Palestine. This was the background against which Mr. Mountfort and his team were asked to advise how the natural resources of Jordan could best be preserved and developed for the benefit of the country.

And what wonderful natural resources these are! The scenery ranges from the near-tropical vegetation of the Jordan valley with its

two large lakes to the bare lava desert of the north and the fantastic cliffs of the sand desert of the south. Scattered throughout the country are the relics of so many different civilisations—the rock-dwellings of Petra, the city amphitheatres of the Romans, the lonely desert hunting-lodges of the Umayyads and the castles of the Crusaders—with the living legend of Lawrence thrown in for good measure. Few countries are endowed with so many tourist attractions, and for the ornithologist there is the interest of a specialised desert fauna, the presence of a number of oriental species and the immense flood of migrants which is channelled through the land corridor on the east side of the Mediterranean. One can pay Mr. Mountfort no higher compliment than to say that his book does full justice to this most fascinating country.

It is profoundly impressive that the Jordanian authorities, with so many much more pressing problems on their hands, should find time to feel concern for the vanishing wild life of their country. It is also most encouraging to read that there is every prospect of early action being taken to implement the expedition's recommendations that three of the most important areas which they visited should be made into national parks, and these should undoubtedly provide a major tourist attraction. If these plans are carried through, the preservation of a most interesting desert fauna and a quite unique series of historical buildings will owe a great deal to the thoroughness of the expedition as a whole and to the enthusiasm and organising genius of Mr. Mountfort in particular. The day may not be so far away when ornithological safaris will be taking the golden road to Petra and Azraq, and this book, with its quite superb illustrations, should ensure full bookings for a long time to come.

D. G. Andrew

Letters

Manx Shearwaters as prey of Peregrines

Sirs,—A recent note by A. J. Gaston (*Brit. Birds,* 57: 466-467) stated that there did not appear to be any previous record of the Manx Shearwater *Procellaria puffinus* as prey of the Peregrine *Falco peregrinus* in Britain. However, E. J. M. Buxton and R. M. Lockley in *Island of Skomer* (1950) reported finding the remains of eleven Manx Shearwaters at a Peregrine eyrie on Skomer, Pembrokeshire, on 2nd June 1946; and they recorded that on another occasion in the same year an adult Peregrine was disturbed while feeding on a freshly dead Manx Shearwater.

D. R. Saunders

Sirs,—With reference to A. J. Gaston's note on a Manx Shearwater found in the eyrie of a pair of Peregrines, in Inverness-shire (*Brit.*

Birds, 57: 466-467), I should like to point out that both James Fisher and R. M. Lockley in *Sea-Birds* (1954) and the latter author in *Shearwaters* (1942) stated that Peregrines used regularly to take Manx Shearwaters on the islands of Skokholm and Skomer, Pembrokeshire.

Mr. Gaston also thought it unlikely that his Manx Shearwater had been caught at sea owing to the eyrie being 40 miles from the east coast of Scotland and over 70 from the west, but surely such distances are nothing for a Peregrine. Since there are no colonies of Manx Shearwaters on the east coast, the Peregrine would presumably have had to travel the longer distance, but even the round trip of 140 miles need not have involved an absence of more than four hours if we allow an average speed of 35 miles per hour. I do not agree that shearwaters migrate overland. R. MARSHALL

[The statement that the Manx Shearwater did not appear previously to have been recorded as prey of the Peregrine in Britain was an editorial insertion for which I accept full responsibility, having overlooked the references quoted above. On the question of the origin of the shearwater, Mr. Marshall probably overestimates the time that a Peregrine would take to travel 140 miles. However, Mr. Gaston tells me that the eyrie held three young and in that case one would expect the Peregrine to be quite sedentary; the other prey consisted almost exclusively of Black-headed Gulls *Larus ridibundus* and pigeons *Columba sp.* and there was nothing else to suggest that they had had to go more than a mile from the nest to obtain food. Mr. Gaston adds that his observations of this and other pairs of Peregrines in that part of Scotland lead him to believe that the adults never leave the vicinity of the eyrie and feeding and preening perches for more than a couple of hours. In any case, wherever the prey was taken and that is something we cannot know definitely, the record is an interesting one. It has also served to prompt the valuable note by P. Wormell on page 149.—I.J.F.-L.]

The 'raptor-flight' of the Cuckoo

Sirs,—With reference to Dr. J. S. Ash's recent paper (*Brit. Birds*, 58: 1-5), I should like to draw attention to the details that I gave in *The Birds of Farleigh and District* (1952: 61) of the soaring flight of a Cuckoo *Cuculus canorus* witnessed by the late A. Beadell on the North Downs in Surrey. I also recorded there an instance of a Sparrowhawk *Accipiter nisus* altering course to approach a Cuckoo and then, surprisingly, allowing it to continue on its way unmolested. The one and only occasion on which I have personally observed this 'raptor-flight' was on 25th May 1937 in Glen Trool, Kirkcudbrightshire; at the time I entered it in my notes as being reminiscent of the flight of a Nightjar *Caprimulgus europaeus* and not unlike that of a Sparrowhawk quartering

ow over the ground. It seems quite probable that it may serve to timidate the small birds in the area being worked by the Cuckoo, as r. Ash suggested, or, similarly, have a subtle mesmeric effect upon em. HUBERT E. POUNDS

rs,—In his paper on 'The "raptor-flight" of the Cuckoo' (*Brit. Birds,* 8: 1-5) Dr. J. S. Ash described a type of flight like that of the Sparrow-wk *Accipiter nisus*. He concluded that the purpose of the flight was to able the Cuckoo *Cuculus canorus* to localise nests of potential fosterers. he following observations may be worth recording as they relate to a milar method of flight by a juvenile.

At about 3 p.m. on 13th August 1948, at Dennis Hill, near Padstow, ornwall, I watched a juvenile Cuckoo flying in circles in a strange anner. The bird was rufous, barred and showed white tips to the il-feathers. Normal, rapid flight alternated with glides, which were llowed by five or six deeper, slower wing-beats. The wings appeared unded at these times and serrations were visible, giving a marked semblance to a Sparrowhawk. The bird gained height during the ower wing-beats, and then followed a period of rapid, pointed-wing ght. The Cuckoo flew at a height of 12 to 50 feet and circled with a ameter of about 100 yards. It appeared little disturbed by my pres-nce, and I watched at the centre of the circle for five minutes. No ll was heard and there was no mobbing by other birds. Suddenly, e bird flew off and was not seen again.

As this was a juvenile in mid-August, nest-finding could not have een the object of the flight. It did not soar as did the Cuckoos escribed by Dr. Ash; in fact, I did not see it rise above about 50 feet. is difficult to explain this behaviour. Juvenile birds sometimes hibit adult behaviour in an incomplete manner in late summer. ossibly this was an example. A. P. RADFORD

Birds 'bathing' in snow and wet grass, leaves and earth

rs,—I was interested in the note by S. G. Madge on a Carrion Crow *orvus corone* 'bathing' on a damp lawn, and in the editorial comment at such behaviour may depend on the availability of standing water r normal bathing (*Brit. Birds,* 57: 328-329).

Two years ago I built a small pool for birds in my garden at New arswick, Yorkshire, and this is kept open nearly all the time in all eathers, yet I have several times seen Blue Tits *Parus caeruleus* and unnocks *Prunella modularis* go through the motions of bathing in wet ass near-by. Still near the pool, I have also seen Blue Tits and arlings *Sturnus vulgaris* bathing in snow, a Dunnock in earth, and lue Tits and once a Great Tit *P. major* in the wetness on leaves of ees after rain. Sometimes the bird concerned has ended by having a ormal bath in the pool, at others it has already been in the pool and

on one occasion a Dunnock's bout of 'grass-bathing' began and ended with a normal bath. Standing water has thus been available for the birds on every occasion and the behaviour described has tended to be an addition to normal bathing rather than a substitute for it. Each time, too, the bird performing these actions has seemed to be greatly excited, sometimes almost frenzied; this has especially applied to the Dunnocks.

I might add that in my garden in winter normal bathing seems to become most popular with several species in very cold weather. This may be because the pool is the only place available in the vicinity at such times, but I have gained the impression that some birds especially enjoy bathing when it is very cold. Further, I find it difficult to understand the propensity of Blackbirds *Turdus merula* and Robins *Erithacus rubecula* for bathing very late in the day. I have noted these birds in the pool up to 4.05 p.m. in mid-December when the temperature has been around freezing and the light so poor that they could only just be seen at a distance of 25 feet. MARY HANCOCK

XIV International Ornithological Congress Great Britain, July 1966

It was announced two years ago (*Brit. Birds*, 56: 196) that the XIV International Ornithological Congress would be held in Oxford from 24th to 30th July 1966, with Dr. David Lack as President and Dr. N. Tinbergen as Secretary-General, and that the only organised excursion would be a week's cruise round Scottish sea-bird islands from 16th to 23rd July. Plans for both the congress proper and the cruise are now well advanced.

The cruise, on the 12,800-ton liner *Devonia*, will leave from Glasgow and sail round the north of Scotland to end in Edinburgh. It will circumnavigate such well-known bird islands and rocks as Ailsa Craig, St. Kilda, the Flannan Isles, Sula Sgeir, North Rona, Fair Isle, the Isle of May and the Bass Rock, and parties will be landed on Rhum and in Shetland and Orkney. Accommodation on board will be in dormitories and in a limited number of cabins with one, two, three and four berths.

A special night train will convey congress members from Edinburgh to Oxford, where they will arrive on the morning of 24th July. Accommodation in Oxford will be arranged in university colleges or, if desired, a list of hotels can be supplied. After a formal opening on the evening of 24th July the rest of the week will be devoted to scientific meetings. These will consist of plenary sessions in the mornings (at which invited speakers will review recent advances in selected fields of ornithology) and of sectional sessions in the afternoons (at which short, offered papers will be read). In addition, there will be a whole-day outing, exhibits, film shows and a social centre for informal contacts.

The congress is open to all ornithologists over the age of 18 years. Applications may be made for the Oxford meetings and the Scottish cruise together or for the former alone. Forms, with full details, can be obtained from **The Secretary-General, International Ornithological Congress, c/o Department of Zoology,**

s **Road, Oxford, England** (applications for the Scottish cruise will be dealt in the order in which they arrive).

e congress fee will be £10 for full members (entitled to attend all functions and ceive the *Proceedings*) and £7 for associate members (wives or husbands of full bers entitled to attend all functions but not to receive the *Proceedings*). Accomation in Oxford will be approximately £2 10s. per day for full board in a college ls are generally more expensive). The cruise will cost from about £30 for itory passengers to about £75 for single-berth cabin accommodation, with the fare from Edinburgh to Oxford additional.

News and comment

Edited by Raymond Cordero

facilities at Cley.—On 1st April the Norfolk Naturalists' Trust is opening to ublic new facilities for bird-watching on its reserve at Cley. These consist of oservation hut overlooking the whole sanctuary, three covered hides at strategic ts, and special pathways through the reed beds and across the marshes where has never previously been allowed. The observation hut is equipped with a nted telescope and its height gives an exceptional view into the centre of the hes; it is also to be available as a shelter and picnic place in bad weather. ss to these facilities is by permit only, obtainable from the Secretary, The olk Naturalists' Trust, 4 The Close, Norwich, NOR 16P, at a cost of 10s. a day dults and 5s. a day for those up to the age of 18.

ese arrangements will impose no new restrictions on the public, who will be to use the East Bank and perimeter roads as previously. A free car park will be able to avoid congestion on the main road which passes the sanctuary. Mean-, negotiations with a view to establishing Cley reserve as a bird sanctuary under erms of Section 3 of the 1954 Protection of Birds Act are understood to be ressing smoothly and formal approval from the Home Secretary is expected soon.

editions to Jordan, Morocco and Iberia.—British ornithologists will be going n force in overseas expeditions this year. Guy Mountfort will be leading a to Jordan with the primary object of assisting the Jordan Government in g up the first of the country's national parks, around the large oasis at Azraq e who have read *Portrait of a Desert* will recall that the successful 1963 expedition mmended that national parks should be established in that area and in the and Wadi Rum regions). Work will include an intensive study of the distion, habitats and breeding and feeding behaviour of the many species of birds h occur within the proposed park boundaries (an area of nearly a million acres), light aircraft will be used for exploration and in ascertaining the populations zelles. Daily censuses will be made of migrants passing through the oasis. bers of the expedition include Sdeuard Bisserôt (photographer), I. J. Ferguson- (ornithologist), Eric Hosking (photographer), E. M. Nicholson (scientific dinator), Dr. J. Rzoska (hydro-biologist), G. R. Shannon (photographer), Townsend (botanist) and D. I. M. Wallace (ornithologist). The party will be e field from 13th April. A combined report on the ornithological aspects of ork of the two expeditions will be published later.

is year has also seen a return to Morocco to follow up work on spring migration ed out in 1963 and 1964. The party, organised by Dr. J. S. Ash and E. D. H. son, also includes Mrs. E. D. H. Johnson, S. Boddy, C. Headlam, Robert cer, M. Taylor and C. A. Walker. It plans to be in the field from about

26th March to 24th April. As before, the main work will be in the vicinity of Figuig, but studies will also be made near Melilla and in the Plain of Tamlelt. The Centre de Recherches sur les Migrations des Mammifères et des Oiseaux, Paris, which will be represented by L. Yeatman and G. Jarry, will supply rings. Research will be carried out into the problems of flight energy and toxic chemicals, and certain observations are to be made at the request of the World Health Organisation. The programme of work is in support of the project being organised by the European section of the International Bird Ringing Committee (EURING) on the problems of Mediterranean-Saharan migration as part of their contribution to the International Biological Year 1966.

Not quite so far afield, Iberia will be the destination of two other expeditions. M. D. England will be returning in April to a remote part of Portugal, where, in what has for some time been a relatively neglected country ornithologically, he has in the last two years done interesting work on distribution and obtained some excellent photographic studies of Black-winged Kite, Red-rumped Swallow, Cetti's Warbler and Melodious Warbler, all of which have been published in *British Birds*.

In the autumn another small party is planning to visit northern Portugal and north-west Spain, to study the migration of passerines, particularly Whitethroats and Pied Flycatchers, in the provinces of Minho, Tras-os-Montes and Lugo, areas which yield big numbers of ringing recoveries. The party will include Trevor Lloyd-Evans, C. J. Mead, B. S. Nau, Giles Pepler and P. J. Wilkinson. The main objects will be to catch, weigh and ring as many migrants as possible, to record the passage in relation to habitat, and to discover why so many recoveries are reported from this general area.

Daily Bird Count scheme.—The Inland Observation Points scheme, started on an experimental basis by the British Trust for Ornithology in March 1962, had accumulated records for over a thousand consecutive days when it was brought to an end as planned last February. For the next phase of this scheme for recording bird movements throughout the country, the name I.O.P. has been dropped in favour of Daily Bird Counts. For worthwhile results some 500 observers are required for this Trust-aided enquiry which, it should be emphasised, is open to those who are not B.T.O. members. Observation forms are supplied free, but a charge of £1 per year is made for the bulletin, if required.

International game biology congress.—The VII Congress of the International Union of Game Biologists will be held in Belgrade and Ljubljana, Yugoslavia, from 23rd to 28th September 1965. It is open mainly to anyone engaged in game biology or wildlife management, but others may attend at the discretion of the organising committee. The programme will include symposia on 'The effects on wildlife of chemical products and land-use techniques' and on 'Damage to agricultural and forest crops caused by game'. The problems discussed will concern both mammals and birds, with the other subjects ranging from deer to forestry and pathology. Intending participants are asked to contact Prof. S. Valentincic, Gerbiceva 60, Ljubljana, Yugoslavia, by 1st May and to give the approximate title of any paper which they may wish to read; the final date for receiving papers will be 15th June. The congress fee will be approximately £5 to £6 and a four-day motor coach excursion afterwards (29th September to 2nd October) will cost about £10 extra.

Newsletter on conservation.—The first issue of *Kingfisher*, a newsletter devoted to the whole field of wildlife conservation, both at home and abroad, appeared in February. Edited by Richard Fitter and obtainable at an annual subscription of 15s. from 1 Bedford Court, Bedford Street, Strand, London W.C.2, it will come out nine times a year at intervals of five to six weeks.

Request for information

s of the Wryneck in Britain.—The British Trust for Ornithology is con-ng for a further year its enquiry into the status of the Wryneck *Jynx torquilla* in in (see *Brit. Birds,* 57: 185) in the hope of obtaining more information than was ble in 1964. Observers are asked to report as quickly as possible any Wrynecks h they may see or hear this year to their county recorder or to the organiser, **. F. Peal, 24 Creighton Avenue, London, N.10.** It must be stressed that on breeding localities will be treated as confidential.

Recent reports

By I. J. Ferguson-Lees

(These are largely unchecked reports, not authenticated records)

summary deals with the six or seven weeks from late January to mid-March. llows on after that in the February issue (*Brit. Birds,* 58: 62-64) and to some nt overlaps with it.

OUT-OF-SEASON SUMMER VISITORS

e curious records of summer species continued the pattern set in December and ary (58: 64). For example, a **Quail** *Coturnix coturnix* at Portland Bill (Dorset) . 11th to at least 17th February matched those in the Isle of Wight and Norfolk December and January. Similarly, following the **Common** or **Arctic Terns** *a hirundo* or *macrura* in Suffolk and Somerset in December and January, we now . that one stayed in Portland Harbour from 16th December to at least the second : of February and that another was seen at Bath (Somerset) on 4th March. e were also several reports of **Arctic Skuas** *Stercorarius parasiticus* between Holy d and Bamburgh (Northumberland) and Whitburn (Co. Durham) in December, ary and February and it was thought that one at least was wintering off that part e coast—perhaps waiting to attack the terns! At the same time a **Great Skua** *aracta skua* was seen in Dingle Bay (Co. Kerry) on 30th January. Far more ordinary than any of these, however, was a **Wryneck** *Jynx torquilla* which was ed up dead beneath some telephone wires at St. Davids (Pembrokeshire) on 31st ary; it was immediately suspected that this must have been an escape, but it s that extremely few of this species are kept in captivity. No less remarkable the identification of a male **Red-backed Shrike** *Lanius collurio* at Northward (Kent) on 14th February. Finally, a most interesting side-effect of the spread e Collared Dove *Streptopelia decaocto* (dealt with elsewhere in this issue) was the ering of a **Turtle Dove** *S. turtur* with a flock of this species near Leeds (York-) from 18th December to at least 14th February.

mpared with these almost unprecedented records, a little spate of **Chiffchaffs** *loscopus collybita* and **Blackcaps** *Sylvia atricapilla* in February and early March ned very ordinary. Nevertheless, these two warblers clearly wintered here in e average numbers. Apart from the Yorkshire **Chiffchaffs** already mentioned 4) and one in Derbyshire on 28th February, all those reported were in southern nties from Sussex to Cornwall (where at least four were seen on Marazion Marsh 4th February) and Co. Cork. **Blackcaps,** on the other hand, were quite widely rted from many parts of England as far north as Northumberland and in Cos. c, Kerry, Limerick and Dublin.

ertain waders formerly regarded as summer visitors or passage migrants only now recorded here every winter. This applies particularly to **Common Sand-rs** *Tringa hypoleucos* (now seen every winter in southern England), **Spotted shanks** *T. erythropus* (for example, as many as three at Minsmere, Suffolk, in ruary), **Green Sandpipers** *T. ochropus* (as far north as Northumberland this

winter) and **Whimbrels** *Numenius phaeopus*. More surprising were reports of two or three **Little Stints** *Calidris minuta* staying at Wisbech sewage-farm (Norfolk/Lincoln border) until January at least and of **Curlew Sandpipers** *C. testacea* in Lancashire, Kent and Co. Cork in January and in Lancashire and Co. Kerry in February. Another unusual happening was the wintering of **Gannets** *Sula bassana* on the Bass Rock (Firth of Forth) for the first time since 1934/35.

The first real reports of returning summer visitors concerned two **Garganey** *Anas querquedula* in Hampshire on 12th March and a few **Wheatears** *Oenanthe oenanthe*, as far north as Norfolk and Buckinghamshire about the same time. The first **Swallows** *Hirundo rustica*, **Sand Martins** *Riparia riparia* and **Sandwich Terns** *Sterna sandvicensis* appeared on the south coast soon afterwards, but these and other arrivals will be dealt with in the next summary.

RARE VAGRANTS

There were few rarities in February and early March, as one would expect, and those reported were mostly in the south-west. In Cornwall the **Gyr Falcon** *Falco rusticolus* at Marazion Marsh (58: 63) was still present on 13th February, while the **Glossy Ibis** *Plegadis falcinellus* on the River Camel (58: 32 and 62) was recorded up to at least 7th March; the **Scrub Jay** *Aphelocoma caerulescens* near St. Just (58: 63) proved, as suspected from the start, to have escaped from an aviary. In the Isles of Scilly a **Greenish Warbler** *Phylloscopus trochiloides* stayed on St. Agnes from 21st December at least into February and a **White-billed Diver** *Gavia adamsii* was identified on the same island from 13th to at least 25th February; the **Snowy Owl** *Nyctea scandiaca* (58: 32 and 62) was still being seen regularly on Tresco in late February. Another Snowy Owl was reported near Chale (Isle of Wight) on 6th March and what may have been the same bird was probably seen on the Hampshire mainland eight days later. American waders included **Short-billed Dowitcher** *Limnodromus griseus* at Sidlesham Ferry (Sussex) from 14th February to at least 13th March and a **White-rumped Sandpiper** *Calidris fuscicollis* at Akeagh Lough (Co. Kerry) on 28th February. The only other American vagrants were **Surf Scoters** *Melanitta perspicillata*: a male was seen off Southerness Point (Kirkcudbrightshire) on 13th February and on several occasions subsequently to at least the end of the month, while in the same period a party of two males and two females was found a few miles to the west at Port o' Warren; it is interesting to recall that one was also recorded off Southerness Point in January 1964. Perhaps the most surprising rarity of the period was a female **Rock Bunting** *Emberiza cia* at Spurn (Yorkshire) from 19th February to at least 5th March; there are only four previous accepted British records of this species.

Among more regular vagrants, **Red-crested Pochards** *Netta rufina* were reported in Kent, Sussex, Northampton, Derby and Nottingham, but the only **Ferruginous Duck** *Aythya nyroca* was one at St. Ives (Huntingdonshire) on 7th March. **Mediterranean Black-headed Gulls** *Larus melanocephalus* were seen at several places on the east and south coasts, particularly in Sussex; **Glaucous Gulls** *L. hyperboreus* south to Co. Durham and Lancashire, and in Devon; **Iceland Gulls** *L. glaucoides* south to Northumberland; and **Little Gulls** *L. minutus* on the east coast and in Devon and Cornwall. A **Spotted Crake** *Porzana porzana* stayed at Slapton (Devon) from 6th December to at least 23rd January. Records of **Avocets** *Recurvirostra avosetta* included one in Cork Harbour in December and early January and an interesting observation of 25 flying east at Gilkicker (Hampshire) on 14th March; the latter perhaps added support to the belief that the Avocets which winter in Devon are part of the Suffolk breeding population. The **White Pelican** *Pelecanus onocrotalus* which had been seen in Norfolk since last summer and was presumably an escape (57: 444) was found dead about 22nd January, but two or three at least of the **Flamingos** *Phoenicopterus ruber* on the east and south coasts (58: 32) seem to have survived the winter, including one as far north as Co. Durham; these Flamingos are all of the South American race *chilensis* and are clearly escapes.

Notice to Contributors

b Birds publishes material dealing with original observations on the birds of in and western Europe, or, where appropriate, on birds of this area as observed her parts of their range. Except for records of rarities, papers and notes are ally accepted only on condition that the material is not being offered to any journal. Photographs (glossy prints showing good contrast) and sketches are omed. Proofs of all contributions are sent to authors before publication.

ter publication, 25 separates of papers are sent free to authors (two or more ors of one paper receive 15 copies each); additional copies, for which a charge de, can be provided if ordered when the proofs are returned.

pers should be typewritten with double spacing, and on one side of the sheet Shorter contributions, if not typed, must be clearly written and well spaced.

otes should be worded as concisely as possible, and drawn up in the form in h they will be printed, with signature in block capitals and the writer's address y written on the same sheet. If more than one note is submitted, each should a separate sheet, with signature and address repeated.

rtain conventions of style and layout are essential to preserve the uniformity y publication. Authors of papers in particular, especially of those containing matic lists, reference lists, tables, etc., should consult the ones in this issue as a : to general presentation. English names of species should have capital ls for each word, except after a hyphen (e.g. Willow Warbler, Black-tailed wit), but group terms should not (e.g. warblers, godwits). English names are : used in *The Handbook of British Birds*, with the exception of the changes listed in *b Birds* in January 1953 (46: 2-3). The scientific name of each species should nderlined (but not put in brackets) immediately after the first mention of the ish name. Subspecific names should not be used except where they are ant to the discussion. It is sometimes more convenient to list scientific s in an appendix. Dates should take the form '1st January 1965' and no , except in tables where they may be abbreviated to '1st Jan.', 'Jan. 1st', or 'Jan. 1', whichever most suits the layout of the table concerned. It is particu- requested that authors should pay attention to reference lists, which otherwise : much unnecessary work. These should take the following form:

KER, B. W. (1949): 'Species and subspecies: a review for general ornitholo- ts'. *Brit. Birds,* 42: 129-134.

HERBY, H. F. (1894): *Forest Birds: Their Haunts and Habits.* London. p. 34.

ous other conventions concerning references, including their use in the text, ld be noted by consulting examples in this issue.

bles should be numbered with arabic numerals, and the title typed above in tyle used in this issue. They must either fit into the width of a page, or be ned to fit a whole page lengthways. All tables should be self-explanatory.

gures should be numbered with arabic numerals, and the captions typed on a ate sheet. All line-drawings should be in indian ink on good quality drawing r (not of an absorbent nature) or, where necessary, on graph paper, but this be light blue or very pale grey. It is always most important to consider how drawing will fit into the page. The neat insertion of lettering, numbers, ws, etc., is perhaps the most difficult part of indian ink drawing and, unless he nad considerable experience of this kind of work, an author should seek the f a skilled draughtsman.

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Territory and food of the Song Thrush

By P. W. Davies and D. W. Snow

STUDY OF the Song Thrush *Turdus philomelos* was carried out over ree years (1954-56) in and around the Oxford Botanic Garden and in rley Wood on the Wytham Estate about 3 miles from the centre of ford. To a large extent it ran parallel with a simultaneous study of Blackbird *T. merula* in the same areas (Snow 1956, 1958a and 1958b), different emphasis was placed on different aspects of the biology of two species according to their apparent interest and the opportuni- for observation.

The Oxford Botanic Garden supports many Song Thrushes which, : the Blackbirds there, are comparatively tame owing to their ociation with man, whereas the woodland thrushes are shy and far er observations could be made on them. A high proportion of the den thrushes were colour-ringed, either as nestlings or when pped as adults, but no attempt was made to colour-ring the wood- d ones. In contrast to the Blackbirds, many Song Thrushes, ringed ile passing through in search of food, were never seen again, and ers held territories for very short periods. Consequently, a much re continuous trapping effort was needed in order to be able to ntify the birds resident at any time.

As a result of consistently colour-ringing and watching the garden ushes, it was found that there was little difficulty in determining the of each individual, even if unringed, mainly from its behaviour.

THE TERRITORY

general picture

nen territorial behaviour was active, observation quickly showed t some Song Thrushes had a strong preference for a particular part the Botanic Garden. There was, however, no clearly defined ındary between adjoining territories. Snow (1956) found the Black-

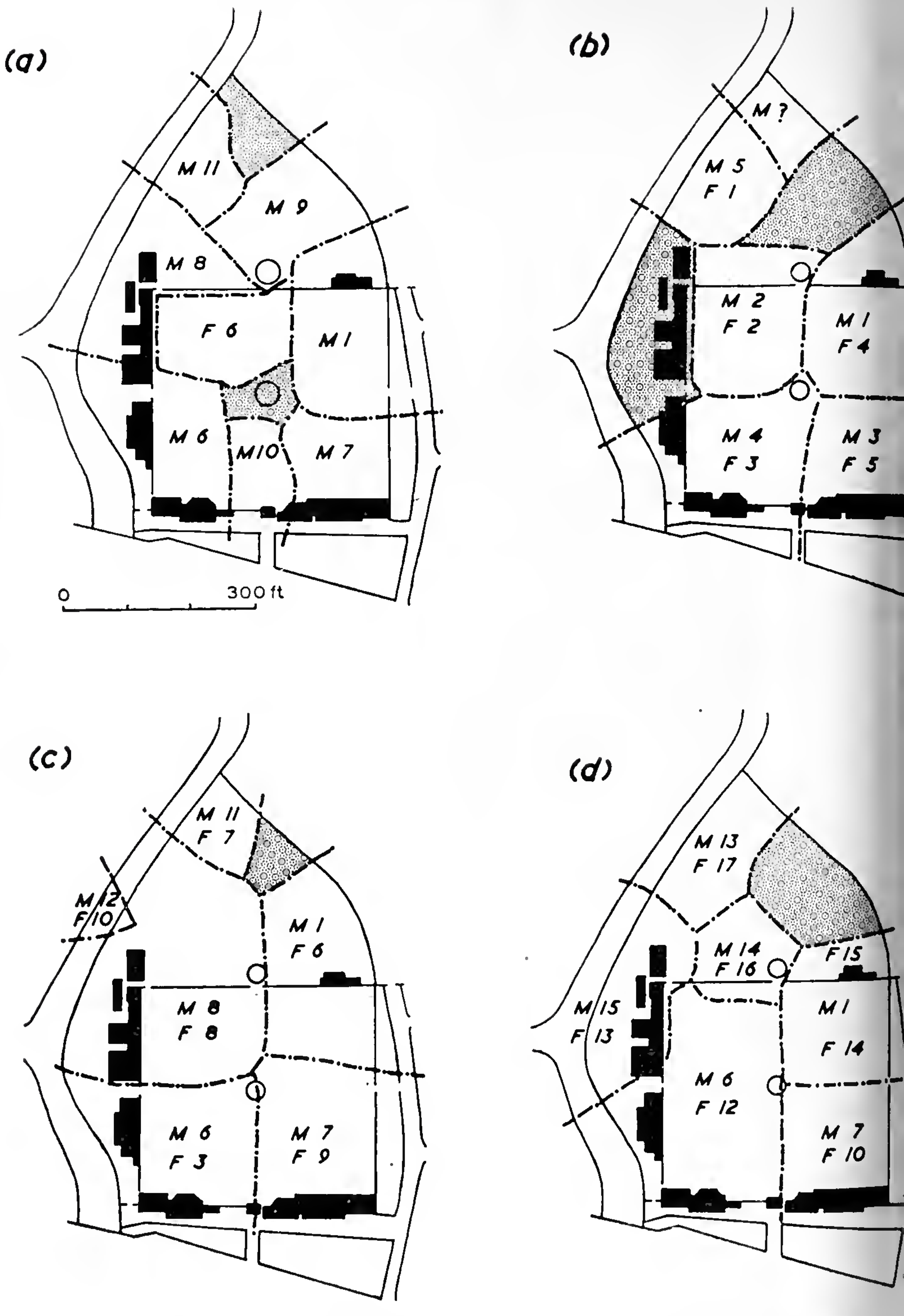


FIG. 1. Territories of Song Thrushes *Turdus philomelos* in the Oxford Botanic Garden during 1954-56: (a) winter territories of seven males and one female in February-March 1955; (b) breeding-season territories of five pairs and an unmated male in 1954; (c) breeding-season territories of six pairs in 1955; and (d) breeding-season territories of six pairs and an unmated female in 1956. The shaded areas were unoccupied. M stands for male and F for female, and each individual has its own number

rd territories in the same area to be distinct and easily mapped, but e density of Blackbirds was much greater than that of Song Thrushes. einbacher (1941), working with a population of Blackbirds of about e same density as the thrushes in the Botanic Garden, found that oundaries were not clearly defined, as did Young (1951) in the case of merican Robins *T. migratorius* which also had a comparable density. would appear, therefore, that an increase in density decreases the tent of overlap between territories.

It was nevertheless decided that boundaries of territories in the otanic Garden could be indicated by a single line without much loss accuracy. The position of the boundary was assessed in the first place sight records, and secondly by the location of territorial disputes, hich were assumed to occur at boundaries. The 'driving' method, as ed by Lockie (1955a) for determining the limits of owl territories, was ied but without success; thrushes will temporarily desert their rritories if unduly disturbed. Fig. 1a gives the territorial plan for e entire Song Thrush population of the Botanic Garden during bruary-March 1955, as shown by these plotting methods. Such aps were drawn at frequent intervals during the course of the study.

Territories are not occupied regularly or consistently, even at times hen territorial behaviour is active. Often, during the day, thrushes arch for food over considerable distances, and in one instance a rticular male was identified three-quarters of a mile outside its terri-ry. A detailed watch on an individual male territory-holder in nuary, when it was occupying its territory more persistently than at y other time, showed that it was present in its territory for about % of the daylight hours. Similarly, at dusk they do not necessarily main to roost in their territories. At this time a number of the rden thrushes were often seen to be attracted to a well-sheltered ost located approximately in the centre of an occupied territory. If e owner was present they would be persistently chased until they had ther gained the roost or darkness prevented further aggression.

In winter, both sexes defend individual territories, but owning males e more numerous than females. At Oxford, over a three-year period different territories were kept under observation, of which only ree were defended by independent females. Unlike Robins *Erithacus becula,* these territory-holding female Song Thrushes did not sing.

Territory-owners usually succeed in driving off intruders without course to actual attack. Territorial fights of varying intensity were ten observed, however, and some of these lasted for as long as five inutes, though in no case did a thrush ever appear to suffer serious jury. Occasionally an abundant source of food, such as a ripening uit crop, became available within a territory. At first it would be efended vigorously, but the presence of many strange thrushes,

arriving from neighbouring and distant territories would gradually force the owner to abandon the part of the territory concerned. Later, when the food supply was exhausted, the original boundaries were usually restored and invading thrushes were again vigorously attacked.

New territories were very seldom established by thrushes that had been ringed as nestlings in or near the Botanic Garden; in contrast, a good number of Blackbirds which had been ringed as nestlings took up territories within the study area. This is in agreement with the ringing data, which show that young Song Thrushes disperse more widely than Blackbirds (Werth 1947).

Figs. 1b, 1c and 1d show the territories in the three breeding seasons 1954-56. There is some constancy of pattern from year to year, due partly to a few individuals, such as M 1, which occupied the same territory for a long period, and partly to the distribution of the walls and plant cover in the garden. At other times of year, the pattern and number of territories were much more variable, as described in the following section.

The annual cycle of territory

A few thrushes occupied their territories consistently from year to year, apart from brief absences in spells of severe winter weather, while others disappeared within a short time of their arrival. Males on average remained longer than females, but even so few remained for more than two years and about half of them disappeared within the year. Only two females were known to stay for more than a year in the vicinity of the study area.

Analysed on a monthly basis, these appearances and disappearances show a recognisable pattern (table 1). New males arrived steadily,

Table 1. Months of arrival and disappearance of Song Thrushes *Turdus philomelos* in the Oxford Botanic Garden

	New arrivals		Disappearances	
	♂	♀	♂	♀
January	2	1	2	–
February	3	3	1	1
March	2	10	2	–
April	–	1	–	–
May	–	–	–	–
June	2	1	1	–
July	–	–	4	14
August	–	–	–	–
September	–	–	–	–
October	–	–	–	–
November	–	–	–	–
December	1	1	–	–

.ough in small numbers, throughout the winter, re-occupying vacated rritories, whereas a very high proportion of the females arrived uring a single month, March, at the beginning of the breeding season. ikewise, most females disappeared in July, at the end of the breeding ason. It is interesting to compare the average annual rate of dis-ppearance from the Botanic Garden with the annual mortality rate of :% calculated from recoveries of ringed birds (Lack 1943a). On an erage, 48% of the males and 80% of the females disappeared from eir territories each year. In the Botanic Garden, therefore, the sappearance of males was probably mainly due to death, whereas the sappearance of females was largely due to migration away from the ea.

In the tendency for females to be more migratory than males, but for small proportion of them to hold individual territories in winter, the ong Thrush resembles the Robin (Lack 1943b) more closely than the ackbird, in which both sexes were strictly resident in the Botanic arden and the pairs usually stayed together through the winter now 1958b).

rritories in winter

. late summer and early autumn, during the moult, territorial be-viour is in abeyance. During the late autumn and early winter rritories are re-established, but this is a gradual and variable process, ost commonly observed in the case of old males who tend to frequent e breeding territory of the previous season. It is also dependent on e food supply. In 1954 and 1956, for instance, when the fruit crop lder, yew and hawthorn) was abundant, resident males were de-nding territories by the second week of November; but in 1955, when e fruit crop was poor and earthworms also were difficult to obtain in tumn as a result of the dry summer, there was little evidence of inter territories before the beginning of December. Later in winter, o, the occupation of territories was found to be very much dependent ı the availability of food, especially earthworms.

After winter territories have been firmly established, they continue be defended with increasing vigour, except during cold spells. early all the Song Thrushes that held territories in the Botanic arden at this time were in their old breeding territories though not all these were occupied. Only one newly arrived male took up a terri-ry in December.

rritories in spring

mild weather territorial activity increases as spring approaches, ading to pair-formation and the onset of breeding. As in winter, ells of severe weather interrupt the process and territories may

temporarily be completely abandoned. At such times disappearances were common, owing to the death or non-return of a territory-holder. Usually coinciding with the return of more favourable feeding conditions, at the end of February or beginning of March, many new thrushes established territories in the Botanic Garden, territorial disputes were frequent, and pair-formation began. Pair-formation, like the establishment of winter territories, is a gradual process. At first, the female is tolerated in the territory and both sexes may be seen feeding together, but the female's attachment to the territory (or the male) is not binding, for she will often fly off. The same female, during the early stages of pair-formation, will land and remain for a short time in many different territories; later, however, she will keep returning to the same territory and remain for longer periods. Gradually she will be found to be associating more and more with one particular male, but it is only just before nesting starts that pair-formation can be assumed to have taken place. In one instance, cold weather in March caused an apparently formed pair to split up; the female deserted the territory and subsequently paired with another male just outside the Botanic Garden.

Territories in the breeding season

The number, distribution and size of the breeding territories remained fairly constant throughout the season (April-July), but occasional changes occurred, following death or a succession of nest failures in a particular territory. During 1955 three new unringed Song Thrushes appeared in early June, a single male and a pair obviously in breeding condition, and tried to establish territories. The pair were soon forced to abandon a half-completed nest which they built within the territory of a resident pair, but they retained possession of a small bush on the edge of the garden, in which they later successfully reared a brood. The single male staked a territory in unoccupied ground and spent a week singing from the top branches of the tallest tree before disappearing as suddenly as he had appeared. Though not individually marked, it is probable that this male had moved from a territory about half a mile away from the Botanic Garden where he had previously been observed unmated and singing vigorously.

Territory and song

Territory and song are closely connected, the fluctuations in the amount of song throughout the year, and its variation from year to year, depending mainly on the intensity of territorial behaviour, which in turn, as shown above, depends to a large extent on the availability of food.

Some points, however, deserve special mention. In autumn, chiefly

September and early October, a subdued type of song is sometimes ard. It is sometimes uttered by males which have remained in their rritories from the previous breeding season, and sometimes by un-tablished birds. In either case it seems to have little territorial gnificance, but perhaps indicates mild dominance. Resident males, r instance, while uttering subdued song, will tolerate strange birds ithin their territories; and sometimes one of a party of Song Thrushes, rching on tall trees within the boundaries of an occupied territory, ill utter a low, hesitant song which has little effect upon other mem-rs of the party or on the resident male. In 1954 and 1956, when uit was abundant, this autumn song was heard much more often than 1955, when fruit was scarce.

The end of autumn song may not always be clearly distinguished om the beginning of true territorial song, which usually starts in ovember when territories begin to be re-established. Some time in e course of December song tends to become intermittent, presumably ecause of the need to spend more time in searching for food; and in e winter song, like the occupation of territory, depends much on the eather.

In Marley Wood subdued autumn song was never heard, and terri-rial song in winter was heard only in one year, in November and ecember 1956, when fruit was very abundant. In January 1957, hen Song Thrushes were first seen in mixed flocks feeding off earth-orms in open pastures, song was no longer heard in the wood.

The function of song in the Song Thrush seems to be similar to that und for the Robin (Lack 1943b) and many other passerines: it assists maintaining the territory against other Song Thrushes by proclaim-g ownership, and it advertises the unmated males to prospective ates. Song with a primarily advertising function is heard chiefly in bruary and March, and is generally of higher intensity than that used maintaining the territory. Later in the breeding season, the most stained song is heard from males that have remained unpaired or have st their mates.

rritories in Marley Wood

precise comparison between Marley Wood and the Botanic Garden made difficult by the lack of detailed knowledge concerning the haviour of the individual thrushes in Marley. Individuals were rely trapped and were never under observation for long periods at time. Nevertheless, it was possible to ascertain the mean seasonal anges in the wood by making frequent visits.

In winter Song Thrushes were rarely seen in the wood, though in e mild weather during November and December 1956 they were ard singing for limited periods. In this year, as already mentioned,

there was an abundant supply of fruit and earthworms were readily available, and territories in the Botanic Garden were occupied earlier than in other years. In each year when observations were made in the period January-March (1954-56) the breeding territories in the wood were apparently established only a short time before nesting began.

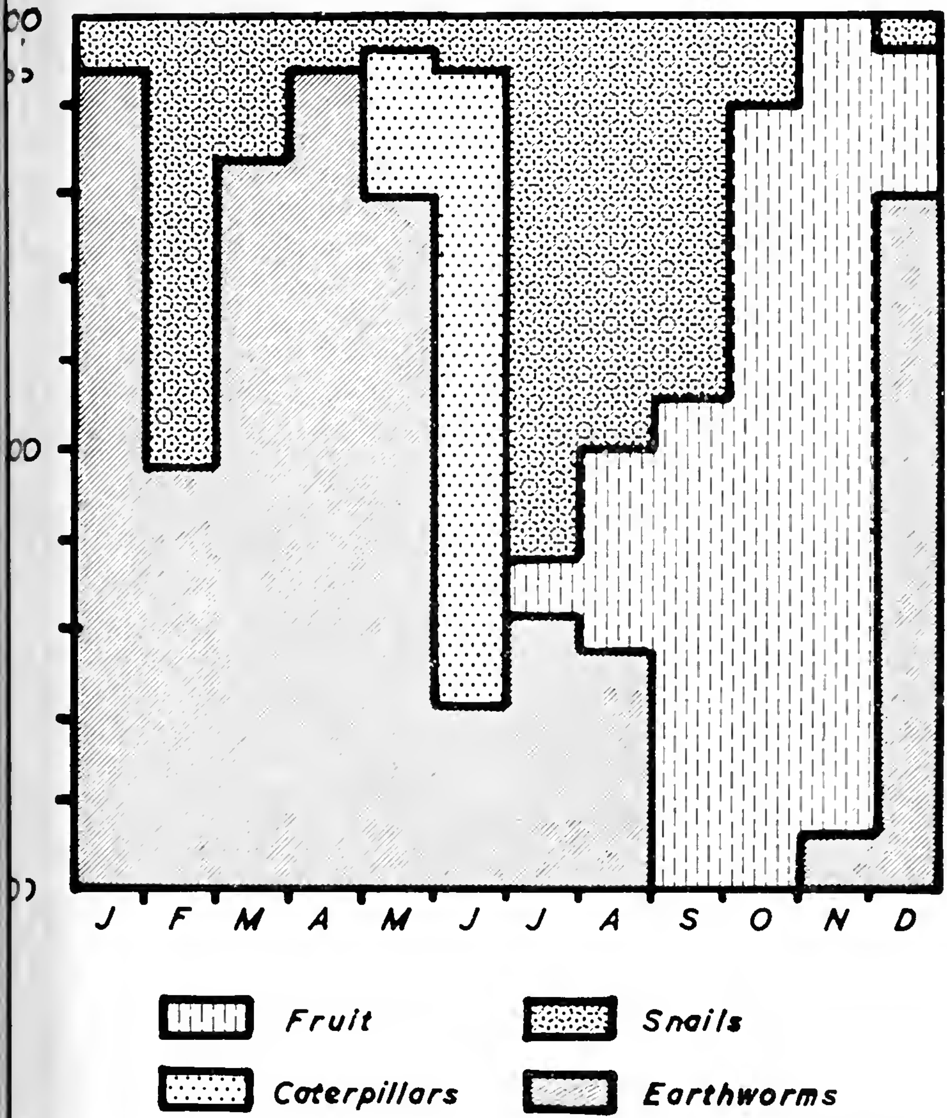
By recording the position of singing males and finding most of the nests, a reasonably accurate estimate was made of the number of breeding pairs. No attempt was made to determine territory boundaries, for disputes between neighbouring pairs were not observed. In 1956 there were six territories at the beginning of the breeding season in 55 acres of woodland, giving a density of about 0.1 pairs per acre. This is approximately the same as that found in a Surrey oakwood (Beven 1963). It is several times higher than the densities recorded in various types of Finnish coniferous woodland (Siivonen 1939), but only about one eighth of the density in the Oxford Botanic Garden.

FOOD

Food and feeding habits were studied by systematically noting all the Song Thrushes that were feeding when first seen in the course of random walks in the area surrounding the Botanic Garden. In addition, the availability of earthworms, one of the most important foods, was studied by obtaining samples from feeding grounds, and the incidence of feeding on snails was studied by collecting broken shells from thrush anvils. In Marley Wood fewer observations were made, but they were sufficient for a comparison with the garden population.

As already mentioned, the Botanic Garden Song Thrushes do not by any means feed exclusively within their territories. They make feeding excursions for considerable distances, radiating for as much as half a mile from the garden. These excursions are of two distinct types. In the first instance, a thrush will visit a particular food supply that is readily available, such as a fruit tree, an area providing many earthworms or even a supply of bread-crumbs, and after feeding intensively for a short time will return directly to the territory. Secondly, when food is not plentiful in the territory, a thrush will seek its food at random, moving from place to place in the surrounding country, returning to its territory only when feeding conditions are favourable. In such cases, resident birds may be absent from the territory for a number of days.

Fig. 2, based on about 900 records, shows in somewhat simplified form the chief natural sources of food during 1955. These were of four kinds: earthworms, snails, caterpillars and fruit. Earthworms were taken most from January to June, except for the greater part of February when snow covered the ground. In June and July, as the breeding season neared its end, the number of Song Thrushes feeding



G. 2. Natural sources of food exploited by Song Thrushes *Turdus philomelos* in the Oxford area in 1955

ı worms gradually decreased until finally in late summer there were › records. It was not until late in the year, in November and December, that Song Thrushes were again seen regularly taking worms. ıails were taken throughout the year except for a limited period in ovember when the fruit crop was most abundant. There were two :riods when they were taken in greatest numbers—in cold weather in :bruary, and in July and August. Caterpillars were taken only for short period in May and June when they dropped from the canopy of :ees in order to pupate in the ground; at this time they were preferred earthworms, and formed an important part of the food for the :stlings. Fruit (mostly berries of yew, hawthorn and elder) was, of

course, taken mainly in late summer and autumn.

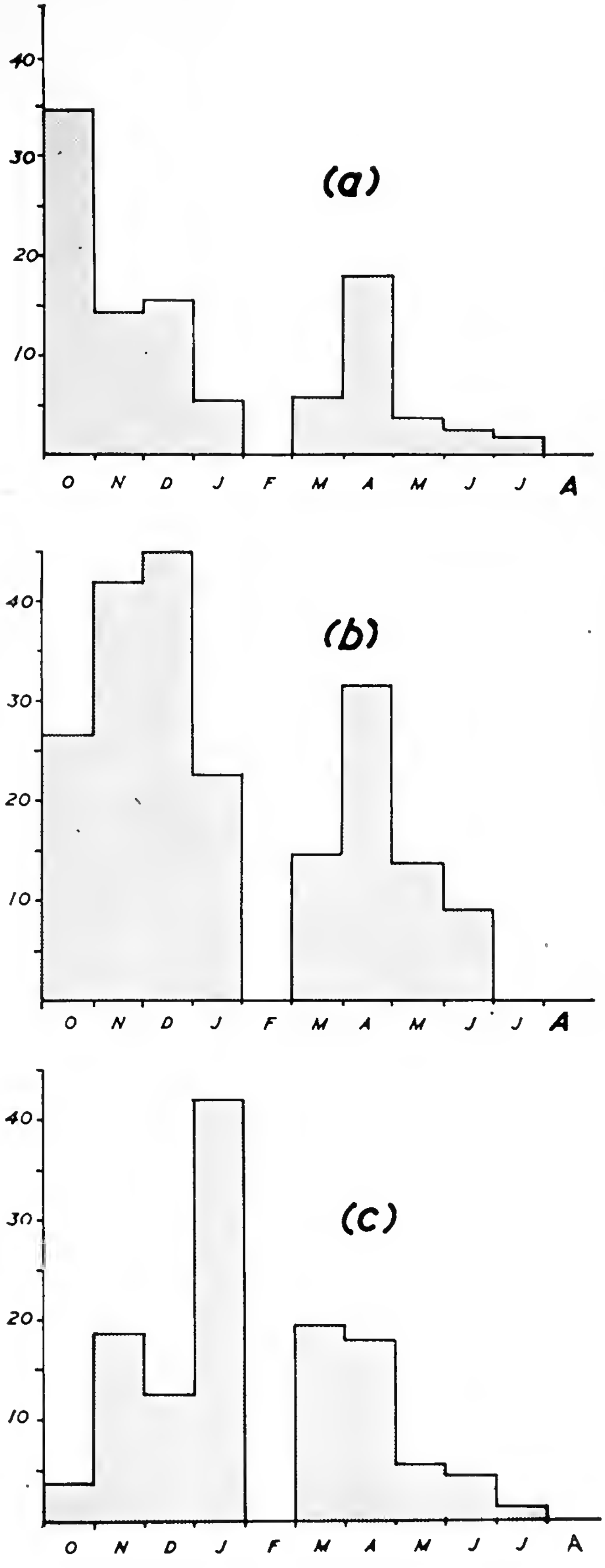
The availability of earthworms in lawns and playing fields near the Botanic Garden was assessed from October 1955 to August 1956 by pouring a solution of potassium permanganate over small sample areas of ground (Evans and Guild 1948), a method which, though not entirely satisfactory (Svendsen 1955), does indicate the main changes in availability, i.e. the numbers that are near the surface. Fig. 3 summarises the results of these samples. The three areas chosen differed from each other to some extent. Thus the Botanic Garden provided many earthworms in October, while the greatest number taken from the adjoining Magdalen College School playing field was in January. Taking all areas together, earthworms were consistently available during the first four months (October-January). In February cold weather and frozen ground reduced the availability to a minimum, but after the thaw in April earthworms were again abundant. Later, towards the end of the breeding season, the availability decreased rapidly until by August earthworms were very rarely taken in the samples.

Lockie (1955b) also sampled earthworms near Oxford and found two peaks in availability similar to those reported here, one in late autumn and the other in April, with a marked drop during cold weather early in the year. It would seem therefore that this seasonal pattern of abundance is regular.

Field observations on Song Thrushes feeding on lawns and playing fields confirmed the evidence as to availability obtained from the samples. Thus at times when the samples indicated high availability, the average time taken to catch a worm was low, the ratio of number caught to number of attempts made was high, and the frequency with which worms were caught and then discarded was high; and vice versa. At times when the estimated availability was low, the amount of pecking at small objects on the surface of the grass was highest.

The amount of feeding on earthworms generally corresponded with their availability as measured by sampling. So, too, the amount of feeding on caterpillars and on fruit corresponded with their availability, though for these the assessment was made only by inspection. Some preferences were, however, evident. When caterpillars were available, the amount of feeding on earthworms dropped, although they too were readily available. Similarly, in the 1956-57 winter, when the fruit supply was especially abundant from September onwards, it was not until it was exhausted, in January, that Song Thrushes were seen feeding on earthworms, whereas in the 1955-56 winter they were first seen feeding on them in November.

In contrast, the amount of feeding on snails did not correspond with their probable availability. An increase in the amount of snails eaten always tended to occur when other food was known to be scarce, and a



G. 3. Availability of rthworms in lawns and aying fields in the Oxford ea from October 1955 to ugust 1956: (a) Botanic arden; (b) Christchurch hool cricket ground; and Magdalen College School aying field. The ordinate ows the number of cubic ntimetres of earthworms r square metre. The mpling method is desibed in the text on page 170

decrease when another food became available again: earthworms when the weather became mild after a cold spell, caterpillars in June, and fruit late in the summer. Goodhart (1958) reached a similar conclusion from a study of Song Thrush predation on snails near Cambridge.

The food in Marley Wood

The Song Thrushes in Marley showed many differences from the garden population in their feeding ecology. During the winter food was often not readily available in the wood because the snails most commonly eaten, *Cepaea nemoralis,* bury themselves in the ground, whereas the garden snail *Helix aspersa* overwinters in old walls and at the bases of shrubs, and can usually be found unless covered by deep snow. Song Thrushes do not sift through leaf litter like Blackbirds, which can obtain food in woodland in this way even in freezing weather. Severe weather in winter therefore caused a decrease in the number of snails eaten in the wood, chiefly because the Song Thrushes left the wood to feed elsewhere, whereas in the Botanic Garden the same weather caused an increase unless there was deep snow. Goodhart (1958), however, found that in a Cambridge wood there was a peak in predation on snails in hard weather in January and February, but the species concerned was *C. hortensis*.

The number of snails eaten in spring and summer was a good indication of the availability of other food. When the thrushes reoccupied Marley Wood in March 1956, during the thaw, snails were eaten in large numbers since they were apparently the only food available. When earthworms became available in the wood in April and May the consumption of snails dropped, until by the last week of May only a few shells were found in the sampling area. At the same time caterpillars began to drop to the ground to pupate, the greatest number falling between the last week of May and the second week of June. It was not until the caterpillars had stopped falling, in late June, that Song Thrushes started to feed on snails again; by this time earthworms, the other main source of food, were not as available as they had been before the caterpillar fall. In July there was a decrease in the number of snails eaten, probably as the result of wet weather which increased the availability of worms again. In autumn, as in the Botanic Garden, as soon as the fruit crop (elderberries) ripened in the wood, snails were rarely taken.

Interspecific competition

When thrushes are feeding in mixed flocks on lawns and fields, aggressive encounters are frequently seen between birds of different species, and less often between individuals of the same species. This behaviour

was studied in the thrushes feeding on Magdalen College School playing field in winter.

In every observed instance the attack was directed against a bird which had just caught an earthworm. Attacks were successful only if an aggressive bird was able to approach a feeding bird unnoticed, because the first reaction of an attacked bird was to jump aside or to take flight with the worm in its beak. In most cases, the feeding bird quickly noticed the approach of another and had time to take evasive action; only very rarely did the aggressor then follow.

By frequently observing these encounters, it soon became obvious that an interspecific hierarchy existed. Mistle Thrushes *Turdus viscivorus* and Fieldfares *T. pilaris* dominated Song Thrushes, Blackbirds and Redwings *T. iliacus,* but were never seen to attack each other. Blackbirds attacked both Song Thrushes and Redwings and also other Blackbirds, while Redwings attacked only Song Thrushes and other Redwings. Song Thrushes were subordinate to all the other species, and were never seen to attack each other.

During the four months when these observations were made, 88 attacks were seen, of which 73% were directed against Song Thrushes, chiefly by Blackbirds. On average, one in three of such encounters was successful. Redwings seemed more capable of evading the attacks of Blackbirds than were Song Thrushes, since only one out of ten attacks on Redwings was successful.

Although Blackbirds were able to obtain some food by parasitising Song Thrushes in this way, the number of earthworms obtained was small (16 successful attacks were observed) compared with the total number of earthworms eaten. It does not seem likely, therefore, that this form of aggression is particularly advantageous to the Blackbird. Furthermore, in Britain mixed flocks of thrushes feed on grassland at times when earthworms are relatively abundant. When the food supply becomes scarce, competition does not increase, because the thrushes change to other foods and interspecific overlap in feeding niche, at least between the Song Thrush and Blackbird, is reduced. Hence it seems that this form of food-fighting in thrushes is not of fundamental importance in the ecology of these species, as it appears to be in some crows (Lockie 1955b) and in tits (Gibb 1954).

DISCUSSION

The purpose of this paper has been to establish the main facts relating to the territorial behaviour of the Song Thrush population studied, its seasonal changes, and its connection with food. Nothing has emerged from the study which is not already known in other members of the Turdidae, but the total pattern is distinctive. It is perhaps surprising that the main outlines of territorial behaviour in such a well-known

species have apparently not previously been traced, but this is to be attributed to the comparatively great amount of shifting which takes place in the Song Thrush population, especially on the part of the females, and the consequent need to maintain a continuous trapping effort in order to follow the changes.

The function of territory has been argued at great length, and the present study has not resulted in critical data of the sort that is now needed to advance the discussion significantly. It is clear that it is in relation to breeding that the main value of territory must be sought in the Song Thrush, since the occupation of territory at other times of year is labile and highly dependent on the availability of food. To what extent the territory assures an adequate food supply for the young by spacing out breeding pairs, is one of the still debated questions, which cannot be answered from our data.

SUMMARY

From 1954 to 1956 a colour-ringed population of Song Thrushes *Turdus philomelos* was studied in and around the Oxford Botanic Garden, and comparative observations were made on a woodland population near-by.

Individuals on average held their territories for rather short periods: few males remained for more than two years, and nearly all the females disappeared within a year. Comparison with the mortality rate as shown by ringing recoveries suggested that disappearances of males were mainly due to death, but that most disappearances of females were due to movement away from the area. A few females held winter territories, but they did not sing.

Outside the breeding season, the occupation of territory, and with it the amount of song, was found to be very much dependent on the availability of food. As a result, there were marked differences in the different years. In the woodland area, winter territories were held in only one year when fruit was very abundant.

The main seasonal changes in food are described. Snails were found to be taken in large quantities only when other food was known to be scarce. Of the other main foods, caterpillars were found to be preferred to earthworms when they were available in late spring and early summer, and fruit, when available, was preferred to earthworms late in the year. Interspecific competition for earthworms between the Song Thrush and other *Turdus* species, though common, is considered not to be of fundamental importance in its ecology, since it occurs most when food is abundant, and when food is scarce the overlap in feeding niches is reduced.

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Shelduck broods in the Tay Estuary

By Henry Boase

N TWO OF SEVERAL earlier papers on the Shelduck *Tadorna tadorna* commented briefly on the behaviour of broods and packs of young Boase 1935, 1938). The present paper sums up in greater detail the sults of continued observation at Kingoodie, on the north shore of e upper Tay Estuary in eastern Scotland.

When the Shelducks return to the Tay in the early spring, some are ready paired and these may almost immediately establish claims to eding territories on the mud-flats near the shore. Each pair's feeding rritory also becomes the loafing place of the male when the female is cubating; it is defended by the male, or both if present, but it is not sed later as a feeding place for the young.

There is much variation in the number of young in a brood, but *he Handbook* gives eight to 15 or 16 as the usual clutch of eggs and e range of brood size I have recorded agrees with this, allowing for ss through predation and accident. For the purpose of analysis I ranged my counts of broods in three-day groups of dates, adjusting e placing of each brood as far as possible according to its estimated ge so that it was possible to arrive at the peak dates for newly hatched oung. In all, 84 counts were included, covering the period from 7th une to 5th July. Of these, 45 broods were in the four three-day roups from 7th to 19th June, when the average was 7.2 young per rood. The highest number of broods in any three-day period was 5 during 10th-12th June.

The question of what constitutes a pack must depend on the maximum possible brood size. *The Handbook* states that clutches of 20 eggs are quite exceptional and it seems reasonable, therefore, to assume that any group of 20 or more young is made up of two or more broods. On this basis my earliest date for the formation of a pack is 16th June, only nine days after the earliest brood date. The counts of sixteen packs seen before 8th July (eight of them in June) varied from 20 to 45. Later in July, additions to existing groups result in even larger packs and the biggest I have seen consisted of 61 young.

Whether a brood or a pack is involved, any group of young is usually attended by two adults at first. As the young grow bigger, however, only one may remain. Sometimes this has appeared to be the male, judging by head shape, breadth of chestnut band, size of black belly patch and lack of white about the base of the bill (the knob on the bill of the male is lost in June and the shrunken base is not clearly visible). The disappearance of one adult from an escorting pair may arise from differences in the onset of the moult. At a small loch on the border of Perth and Angus the female departed in the middle of July and the male in the last week of that month.

I also have a record of a pack apparently in the charge of three adults and another where four were involved. The latter was seen on two occasions two days apart, which seemed to confirm that it was not just a temporary association.

The female alone was in charge of a brood of seven less than a week old as late as 17th July 1959. This brood fed only in a small patch of sedge and not over the open mud-flats; the number of young was reduced to six by 31st July and to five by 16th August. The adult was in body moult by the end of July, but could still fly on 13th August and remained at her usual place until at least 30th August, by which time the juveniles were independent.

On the other hand, one group of six was left to fend for itself when not more than seven days old in mid-July (the last adults were seen on 8th July and none was left on the 12th, the brood being first recorded on the 15th). These ducklings were in good condition on 8th August and four at least remained in the vicinity up to 2nd September or even later. The only other Shelduck seen on the flats during the whole of this time was a group of ten fledged juveniles about a mile away on 18th July.

There is a definite routine in the feeding behaviour of a brood or pack. The downy young are very active in their search for food on the flats, but at intervals of about an hour their escort calls them together, either to halt them beside some stone on the flats or to lead them to the shore where on seaweed-covered stones or among sedges they are rested for periods of 40 to 20 minutes depending on their age. This be-

haviour, and the resulting disappearance of whole broods for such lengthy periods, can make it confusing to count the numbers on the flats from hour to hour. During the rest period the adult or adults generally remain dozing or preening beside the brood. On two occasions, however, a group of young was left 'parked' while the two adults with them went away on their own for a short while and the following account of one of these incidents will make clear the main points of the behaviour.

A pack of 45 young escorted by a pair of adults were feeding on the open flats and eventually stopped at a flat stone on to which most of the juveniles climbed and settled for a rest, the two adults dozing beside them. The time was 10.30 a.m. At 10.45 the male departed to the tide line and at 10.58 the female walked over to the shore out of sight. The pack remained dozing. At about 11.03 the male returned and the female came back at 11.11. At 11.15 the adults began to get restless and to move away, but only two of the juveniles followed them and so all four birds returned to the main group. At 11.21 four of the young started to feed and were joined by another three, then eleven more. At 11.25 the two adults and these 18 young (all but two of the larger juveniles in the pack) were about 50 yards from the resting place and the remainder of the birds. Two of the smaller juveniles then started to run to overtake the group with the adults and by 11.27 they had been followed by the rest. As the party then fed on the mud-flats, it broke into scattered groups and at 11.40 the adults gathered the pack together and all moved away in close formation, still feeding, towards the tidal gullies in the flats.

The above details are given to show how uncertainty can arise as to whether a brood or pack is in the charge of one or two adults, how confusion can be caused by a pack becoming divided for a time and how, as the young grow, the pack tends to break up into age groups. Even in a single brood, the individuals may not all grow at the same rate. When their body feathers are fully grown but they are still not capable of flight, some advanced juveniles apparently feed during all or part of the group's resting period and so tend to drift away with an increasing slackening of the pack-bond.

The adults in charge of a group are sometimes aggressive towards other Shelducks. The pair whose behaviour has been detailed above encountered another feeding pair while on their way to the tide line and one of them (presumably the male) drove the latter from the area.

Another clash occurred when a pair with eight young were feeding in their usual area and a pair escorting a pack of 47 young approached from further west. The two groups met on a narrow strip of mud, whereupon the male escorting the pack vigorously attacked the other and seized it by one wing; in trying to free itself the latter pulled its

attacker over the flats, scattering the broods in all directions. Both males then started using their wings in attack, flapping and splashing in the shallows, until presently the one which had been attacked broke away, rejoined his mate and hurried away with her and their eight young.

One dispute took a different form. A pair without a brood were feeding on their usual 'beat' near a channel of running water when a pair with 17 young settled for a rest on the open flats on the other side of the channel. The male of the pair without a brood ceased feeding and ran to cross the stream, whereupon the other male met him in midstream and then the female also left the young to help repel the attack. Meanwhile, the brood moved slowly away. The attacker turned aside when faced by the pair which then ran back to their young with heads held low and backs humped up (an attitude normally used in attack) and inspected them. Presently both pairs began to feed and the brood resumed its rest. The resentment of the non-breeding pair seemed to be based on the holding of a feeding territory. Such territorial jealousy is noticeable in the earlier part of the breeding season, but by the time broods and packs are abroad on the flats it has usually faded and groups of adults feed together without rancour.

Gillham and Homes (1950) referred to attacks on passing broods by any adults which were near-by, but nothing of this kind has been noted on the Tay Estuary and any hostility seen there has been directed at other adults.

I have several records of groups of fully fledged young remaining in the company of one or two adults (some adults may still be in almost perfect breeding plumage in September, while others seem to attain full eclipse and yet be capable of flight). One such family party of two adults and five juveniles was seen at Montrose as late as 23rd September 1961: one adult, which appeared to be a male, showed little sign of moult, but the other had lost some contour feathers from the chestnut band and under-parts; the juveniles were moulting to varying extents into the first full plumage. The group presently took wing and alighted, still together, a quarter of a mile away where they were later seen dozing in close company.

Although series of counts are available for at least twelve packs, these are too inconsistent to justify any conclusions concerning the advantages of thus congregating together. In most cases the figures show an increase, a period of steady numbers and then a break-up which presumably depends on the age variation in the group. On the other hand, broods which do not join packs seem to survive well enough.

SUMMARY

This paper on Shelducks *Tadorna tadorna* in the Tay Estuary, Scotland, deals with the early establishment of a feeding territory; the attendance of adults on broods or

icks; the feeding routine and rest period; the aggressive behaviour of caretaker dults and territory holders; and the late association of adults and fledged young. onsideration of the dates and counts of 84 broods indicates that the peak period for eir arrival on the Tay mud-flats is 10th-12th June and that the average number of oung in a brood there is seven. A pack is taken as consisting of at least twenty oung and the earliest date recorded at Kingoodie was 16th June.

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More examples of the best recent work by British bird-photographers

(Plates 25-32)

HIS IS THE SIXTH annual selection of the best contemporary work y British bird-photographers. The large number of excellent prints ubmitted has made the final choice particularly difficult. As before, owever, other things being equal, we have tended to give preference photographs of species which have not previously appeared in the ries and also to ones by new or less well-known photographers. In e six years the work of no less than forty different people has been presented, which shows the healthy state of bird-photography in this ountry.

For the benefit of new readers, it may not be out of place to summare again the aims of the series. They are to place on permanent record one journal the finest bird-photographs produced, to encourage ompetition, to give newcomers an opportunity of seeing their work ublished, and to show photographs which normally fall outside the ope of those in *British Birds.*

This selection includes pictures by three photographers who have not atured previously in the series: James Hyett's Arctic Skua *Stercorarius rasiticus* with young (plate 26b), G. H. E. Young's pair of Meadow ipits *Anthus pratensis* together at the nest (plate 30b) and R. P. Bagnall-akeley's Carrion Crow *Corvus corone* at bait (plate 31b). Special menon must be made of the last because it was taken with a new and most nusual lens. This was a Russian mirror lens with a fixed aperture f/10 and an enormous focal length of 1,000 mm. which enabled Mr. agnall-Oakeley to work from the considerable distance of 30 yards. e did not use a proper hide, but took the picture through a hole in a attle screen backed with hessian. The bait—a Woodpigeon *Columba*

palumbus—had been put out to attract Magpies *Pica pica*. Such a lens is not easy to handle and focusing is critical. Its great disadvantage is its small aperture which necessitates a comparatively long exposure and so prevents its use for colour photography or moving objects. However, in spite of such limitations, this picture shows that outstanding long-range results are possible.

Flight photographs help to emphasise field-characters and it is encouraging that more photographers are trying to portray birds in the air. Here we have no less than three different flight studies, ranging from Arthur Gilpin's close-up of a Fulmar *Fulmarus glacialis* (plate 28a), in which sunlight shows the poise and feathering to perfection, to Carl Stockton's long-range shot of a fast-moving pack of Knots *Calidris canutus* (plate 28b). In between on size and detail comes Morley Hedley's attractive composition of eight Grey Lag Geese *Anser anser* (plate 32), one of the best we have seen of this species in flight as it is difficult to get close enough to wild geese to show any detail at all.

Much has been written in recent years about the alarming decrease and even total disappearance of Sparrowhawks *Accipiter nisus*, probably from the effects of organo-chlorine pesticides, and so it is a pleasure to reproduce Keri Williams's fine portrait of one nesting in Breconshire (plate 26a); we hope that the young were reared successfully. Another predatory bird recently shown to have been affected by pesticides is the Raven *Corvus corax*, illustrated here by D. M. Turner-Ettlinger's evocative picture at a bulky nest on a crag (plate 29); note the adult's full crop as it is about to feed the young.

The only photograph in this selection which was taken abroad is Dr. K. J. Carlson's female Lapland Bunting *Calcarius lapponicus* (plate 31a). We cannot recall seeing many pictures of this species, though a series by various photographers was reproduced in this journal as long ago as 1954 (*Brit. Birds*, 47: 232-233 and plates 37-40).

The remaining birds featured here are ones which have often been photographed, but seldom so well. Kittiwakes *Rissa tridactyla* make delightful pictures, but W. S. Paton's one on a Scottish sea-cliff (plate 25), its gentle appearance enhanced by the side lighting, must surely rank among the best. E. K. Thompson's Great Crested Grebe *Podiceps cristatus* (plate 27a) was completely at ease and quite oblivious of his presence in the hide. By way of contrast, Harold R. Lowes's Red-throated Diver *Gavia stellata* (plate 27b) was preparing to leave the nest and slide into the water as someone approached. Lastly, we wish particularly to compliment A. Winspear Cundall on his restraint in 'gardening' the site of his Ring Ouzel *Turdus torquatus* (plate 30a): many photographers would have removed the right-hand branches and so completely spoilt the natural effect, quite apart from possibly endangering the nest.

PLATE 25. Kittiwake *Rissa tridactyla*, Ayrshire, June 1964 (*William S. Paton*)
(pages 179-181)

PLATE 26A. Sparrowhawk *Accipiter nisus*, Breconshire, June 1964 (*Keri Williams*)

PLATE 26B. Arctic Skua *Stercorarius parasiticus*, Shetland, June 1964 (*James Hyett*)

LATE 27A. Great Crested Grebe *Podiceps cristatus*, Cheshire, July 1963 (*E. K. Thompson*)

LATE 27B. Red-throated Diver *Gavia stellata*, Shetland, June 1964 (*Harold R. Lowes*)

A. Fulmar *Fulmarus glacialis*, Shetland, June 1964 (*Arthur Gilpin*)

B. Knots *Calidris canutus*, Glamorgan, September 1963 (*Carl Stockton*)

PLATE 29. Raven *Corvus corax*, Anglesey, April 1963 (*D. M. Turner-Ettlinger*)

PLATE 30A. Ring Ouzel *Turdus torquatus*, Derbyshire, May 1964 (*A. Winspear Cundall*)

PLATE 30B. Meadow Pipits *Anthus pratensis*, Somerset, May 1962 (*G. H. E. Young*)

PLATE 31A. Lapland Bunting *Calcarius lapponicus*, Norway, June 1963 (*K. J. Carlson*)

PLATE 31B. Carrion Crow *Corvus corone*, Norfolk, October 1963 (*R. P. Bagnall-Oakeley*)

PLATE 32. Grey Lag Geese *Anser anser*, Perthshire, November 1964 (*Morley Hedley*)

We should like to take this opportunity of thanking all who have submitted prints to us and we hope that they will continue to do so. We are particularly grateful to the Zoological Photographic Club and the Nature Photographers' Portfolio Society, to one or other of which the majority of bird-photographers belong. These organisations play a major part in maintaining the high standard of bird-photography in this country by providing their members with an opportunity of criticising each others' work.

ERIC HOSKING

Some comments on the problems of separating Reed and Marsh Warblers

[THE FOUR LETTERS which follow form a kind of special symposium on the difficulties of distinguishing Marsh Warblers *Acrocephalus palustris* and Reed Warblers *A. scirpaceus* by their songs and even in the hand. When we received the first from K. Atkin and A. D. Townsend, we sent it to G. A. Pyman as one of those who have had great difficulty with a population of mimetic Reed Warblers in Essex and then to C. M. Swaine as one with considerable experience of Marsh Warblers who believes that there should be no confusion between the full songs of the two species. The final versions of the letters which they have contributed were written after each had seen a draft of the other's comments. Lastly, we sent the whole correspondence to Peter Davis who, as Migration Research Officer of the British Trust for Ornithology, has been concerned not so much with separating the songs as with the problems of distinguishing atypical individuals and particularly juveniles in the hand. We are now publishing the four letters together in the hope that they will help observers faced with these problems and at the same time encourage others with special experience of Marsh and Reed Warblers to give us their comments.—EDS.]

Mimicry in song of Reed Warbler

Sirs,—The song of the Reed Warbler is usually described as being mimetic only to a limited extent, consisting mainly of a series of repeated phrases delivered in a rather slow manner. However, there is considerable evidence that the species is capable of a more highly developed song resembling that of a Marsh Warbler. This has been noted quite frequently in the south of England and has caused some confusion, even resulting in the nickname 'Mead Warbler'.

Observations at Bardney Ponds, Lincolnshire, during June and July 1964 showed that the Reed Warbler's song can develop as the result of direct mimicry. A Marsh Warbler occupied a territory at the

ponds from 14th to 22nd June and was frequently in full song. Its identity was confirmed by trapping on the 16th. On the 20th it was seen to enter a small patch of reeds in which an isolated unmated Reed Warbler was singing normally. After the Marsh Warbler sang briefly it was chased out and returned to its original territory. About half an hour later the Reed Warbler approached the Marsh Warbler and began to imitate a few phrases of its song. Sometimes both birds were singing together. Over the next two days the Reed Warbler's song developed until it was always singing with a 'Marsh Warbler type' song.

After the Marsh Warbler had departed, the Reed Warbler still continued to sing with the highly developed song. This was remarkably similar in form to that of the Marsh Warbler, including a series of high-pitched liquid trills and a nasal *chay*. There was also a series of fluty whistles not heard from the Marsh Warbler. However, the main differences were the poorer quality of the high-pitched notes, the inclusion of deeper and harsher notes and the slower phrasing of part of the song.

To confuse matters, the bird now occupied the territory formerly held by the Marsh Warbler, but its identity was confirmed by trapping on the 30th. Several weeks later its song had become even more varied, including excellent imitations of the clear triple *tu-hu-hu* note of the Redshank *Tringa totanus* and the harsh, drawn out *keearr* note of the Common Tern *Sterna hirundo*. Both these species were frequently present at the ponds during the summer.

It is possible that Reed Warblers are frequently stimulated into a more highly developed song, especially where their range coincides with that of Marsh Warblers. This would also be more likely in the cases of Reed Warblers which frequently occupy 'Marsh Warbler type' habitats, though the reverse happened in the above instance. It is interesting that the new song was not lost once the stimulus had departed, even though many other Reed Warblers were present, all singing normally. K. ATKIN and A. D. TOWNSEND

Sirs,—The events described above by K. Atkin and A. D. Townsend well illustrate the considerable mimetic powers which intensive observations in Essex and elsewhere during the past few years have shown that the Reed Warbler possesses, although few individuals use those powers to any appreciable extent and many not at all. For the most part, mimetic Reed Warblers have been found occupying territories either on the fringe of reed-bed colonies inland or in isolated situations where the habitat has frequently been of the type normally associated with the Marsh Warbler. Indeed, the best mimic I have yet heard was found in June 1963 in long-established Marsh Warbler

terrain in Gloucestershire. An analysis of the tape-recording taken of this individual revealed that in the space of about a quarter of an hour it had imitated, in some cases many times over, the calls or phrases of no less than 16 other species. The quality of this bird's mimicry was extremely high, and for long periods there was scarcely a trace of the thin, slow phrases of the Reed Warbler. Several Essex Reed Warblers have, however, closely approached the Gloucestershire individual's performance, and one in 1963 was found to have imitated 15 other species, notable among these being the Green Woodpecker *Picus viridis,* whose 'yaffle' it once mimicked five times in rapid succession! Another, present in the same area in 1964, was first located when a flood of assorted mimicry, quite up to Marsh Warbler standard, poured forth from the depths of a large hawthorn bush.

It is clear that the literature dismisses the Reed Warbler's talents far too lightly: not only have various authorities placed it a poor third as a mimic after the Marsh Warbler and Sedge Warbler *A. schoenobaenus,* but the inference is also often drawn that if a bird which is either a Marsh Warbler or a Reed Warbler is heard imitating a number of other species, it can be assigned with some confidence to the former species.

The letter from Messrs. Atkin and Townsend has, therefore, served to draw attention to what virtually amounts to a gap in the literature and to the difficulties which those who are not thoroughly familiar with the songs of both species are likely to encounter when they meet up with one of these extremely mimetic and fast-singing Reed Warblers.

G. A. PYMAN

Sirs,—In view of the interesting account by K. Atkin and A. D. Townsend of the development of a Reed Warbler's song, and the considerable problem which seems to exist for some observers in differentiating between the songs of Marsh and Reed Warblers, the following comments may be of some use. My own first-hand experience of Marsh Warblers extends over twelve consecutive seasons, but is limited to Gloucestershire localities.

I am in complete agreement with those who point out that some Reed Warblers are far better mimics than the literature indicates and I am sure that G. A. Pyman is correct in suggesting that such individuals occupy habitats other than extensive reed-beds. In Gloucestershire, in the absence of large areas of reeds, Reed Warblers frequently inhabit osiers. Many share habitats with other species, including Marsh Warblers, and these Reed Warblers often produce varied and mimetic songs. Nevertheless, I am of the opinion that a Marsh Warbler *in full song* can always be distinguished from any Reed Warbler by the quality and the pattern of its song. The Marsh Warbler's song is not merely superior; it is different in form.

To my ears, the Reed Warbler's song, no matter how varied and mimetic, has a basic rhythm which is never disguised for long. It is indicated by the familiar type of phonetic rendering—*chup-chup, chirk-chirk, twee-chirruc, twee-chirruc, whit-whit, chirp-chirp, chirruc-chirruc*—and seems to be based on a disyllabic pattern in which a kind of double beat or emphasis can be detected most of the time. In the good-voiced individuals which have caused confusion, this basic song is interspersed with a wide variety of other notes, often mimetic, but the fundamental pattern is only partially obscured. I have heard tape-recordings of one of the Essex birds and of the Gloucestershire one referred to by Pyman, and both are plainly *not* Marsh Warblers, although I understand that each was at first suspected of being so.

The ways in which the Marsh Warbler's song differs from that of the Reed are much more difficult to describe than to appreciate by ear. The essential differences seem to me to be as follows:

(1) The Marsh Warbler lacks, or shows no more than traces of, the characteristic rhythm of the Reed Warbler referred to above. Full song is remarkably flowing and gives an impression of continuity lacking even in the best songs of Reed Warblers.

(2) The Marsh Warbler's song is much sweeter than the Reed's, especially in the higher registers which form a conspicuously greater proportion of its song. The general effect is that of a higher-pitched delivery which is often, but not always, faster.

Mimicry has long been regarded as a notable feature of the Marsh Warbler's song, but, in view of the achievements of some Reed Warblers in this direction, it should perhaps no longer receive such emphasis as a means of distinguishing them. However, I am still firmly of the opinion that the Marsh Warbler is much the better mimic of the two, not so much as regards the variety of imitation, but in its degree of perfection.

Without belittling the Marsh Warbler's ability, it may be worth mentioning that some observers are less impressed, at first hearing, by the mimetic attributes of the song than by its vigour, variety and highly melodious quality. A brief description by Dr. David Lack (*in litt.*)—'like a cross between Blackcap *Sylvia atricapilla,* Nightingale *Luscinia megarhynchos* and Sedge Warbler *Acrocephalus schoenobaenus*'—seems to me to convey a very useful impression of the song.

Lest I appear to be minimising the problem, it should be stressed that the foregoing comments refer to full song. A Marsh Warbler in desultory song may not be safely recognisable even by those who have been fortunate in gaining previous experience of the species.

C. M. Swaine

Sirs,—Your decision to publish these letters on mimetic song in the

Reed and Marsh Warblers will be generally welcomed, since many bird-watchers will have heard verbal accounts of the 'Mead Warbler' problem (often in a garbled version!) and a published statement was overdue. It is clear, however, that there is still much to be learned before all the problems connected with identification of these two species are satisfactorily solved, if indeed they can ever be solved; we may have to learn to live with 'Mead Warblers', just as the Americans have learned to live with '*Empidonax* Flycatchers'.

While preparing the recently-published revision of the B.T.O.'s *Guide to Ageing and Sexing* (Field Guide No. 10) I became involved in much correspondence on this subject, and it may be helpful if I attempt to summarise some of the information which came my way. I hasten to add that I shall be concerned more with defining the extent of the problems than in attempting to clarify them.

Song

G. A. Pyman, A. D. Townsend and K. Atkin were kind enough to send me detailed accounts of their experiences, and another interesting contribution came from D. I. M. Wallace who had been observing Marsh Warblers at Neusiedler See in Austria in May 1964. He wrote (*in litt.*): '... their songs were not of the high musical quality expected of this species. They were tremendous mimics and chattered less than *scirpaceus*, but compared to the best *palustris* that I have heard there was a clear difference. This of course may be a question of local dialect...' Mr. Wallace added that his notes on the songs of these birds closely resemble those he had made while listening to the 'Mead Warblers' at Rye Meads, Hertfordshire, in 1962. In view of his remarks, it seems likely that the central European Marsh Warblers may have an inferior song to those breeding in western Europe and in England, and, since it is very likely that central European birds sometimes overshoot into Britain in spring, such inferior songsters may establish themselves temporarily in Britain. The Marsh Warblers which reach Fair Isle most years in late May or June are most probably from central Europe, and it is interesting to note that two arrived at Fair Isle on the day following the appearance of the Bardney Ponds bird mentioned in the letter from Messrs. Atkin and Townsend, in the same easterly air-stream.

Plainly it is very desirable that recordings of Marsh Warblers from various parts of the range, together with recordings of mimetic Reed Warblers, should be brought together and compared in detail. It is also much to be desired that special efforts should be made in future to examine in the hand any unusual songsters, such as the Tewkesbury bird mentioned in Mr. Pyman's letter, and so to confirm the identification as far as is possible.

The Bardney Ponds episode demonstrates that a Reed Warbler may be stimulated to unusually highly-developed song and mimicry by the presence of a singing Marsh Warbler, but it is not yet clear if this behaviour can arise in the absence of Marsh Warblers. It is possible that Mr. Pyman's Essex mimics, and those at Rye Meads in 1959-62, as well as C. M. Swaine's Gloucestershire birds, had all received this special stimulus from the very closely related species, either in Britain or in the winter quarters. An adult bird which from its description and wing-formula was almost certainly a Marsh Warbler was trapped in the Rye Meads colony in July 1960 (T. W. Gladwin). It will be interesting to see if the Bardney Ponds Reed Warblers produce further mimicry in future years, or if this behaviour dies out as it soon did at Rye Meads and some of the Essex sites. Reed Warblers frequently nest outside reed-beds (probably more so in years of high population) and, indeed, some colonies exist in the absence of reed-beds. In such circumstances they come into close contact with a wide variety of other breeding passerines; yet well-developed mimicry appears to be rare unless (as in Gloucestershire) there are Marsh Warblers in the same habitat. This aspect should repay careful investigation in the future.

Plumage

There appear to be no constant differences in colour of plumage or soft parts between first-winter birds of the two species. Observers with considerable experience of Marsh Warblers appear to be agreed that the adult in spring and summer generally has a distinctly greenish tinge on the upper-parts; while the under-parts tend to be very pale with a light yellowish-buff suffusion, especially on the flanks, and the throat is normally pure white. Most show little contrast between the mantle and rump (none of the eight spring birds I handled on Fair Isle between 1959 and 1963 showed more than a slightly yellowish tinge on the rump); but, according to N. Sischka of Germany (*in litt.* to R. Spencer), many first-summer birds do show a rusty tinge on the rump and (probably because of the greener mantle) this contrast may be even more striking than in the Reed Warbler. Mr. Wallace wrote of the Marsh Warblers at Neusiedler See: 'The rump was a little lighter or brighter in colour than the mantle, though in no terms was it more "ginger". The difference had to be looked for specifically; it was not obvious as it usually is in *scirpaceus*.'

Adult Reed Warblers are in general darker and browner on the upper-parts, often with a rufous tint, and usually show a distinctly 'ginger' rump, while the buff wash on the under-parts, particularly on the flanks and under tail-coverts, is normally darker and warmer in tone. There is considerable individual variation, much of it probably due to wear, but the species seems never to acquire the greenish tinge

ı the upper-parts which is characteristic of the Marsh Warbler. . Crudass and T. R. E. Devlin have been making a valuable detailed udy of plumage variation in adult Reed Warblers at Rye Meads, and ave recently published a preliminary account of their findings in *Rye Meads Annual Report for 1963*. They have 'handled birds having right rufous, rufous, uniform brown, very grey brown, and dull rown upper-parts, with or without contrast between mantle and ump. Under-parts have ranged from practically white through reyish white to very slight, slight, heavy and very heavy buff suf- usion.' They conclude that by using criteria 'based on present terature and information, it is not possible, satisfactorily, to separate ie Marsh Warbler on plumage characteristics'. They appear, owever, to have no personal experience of Marsh Warblers and I ould personally consider this an over-cautious judgement; but it hould certainly be borne in mind by anyone who seeks to establish ie identification of a Marsh Warbler in the field, particularly in ocalities where the species is not known to occur.

Other possible field-marks such as leg-colour (very pale in Marsh, ut sometimes pale in Reed also) and gape-colour (primrose in Marsh, eeper orange-yellow in Reed) are not likely to be usable in most rcumstances, but the two species appear to me to have a different zz', and this is mentioned in the literature; the Marsh is a bulkier rd and more *Sylvia*-like in outline than the slender Reed. D. I. M. Vallace appropriately describes this Marsh Warbler characteristic as plumper, belly-down, appearance, that *scirpaceus* normally lacks'.

Ving-formula

he measurements and structure of the two species are so similar that o single character offers a complete and comprehensive means of eparating them. The Marsh has on average a very slightly longer ing and slightly shorter bill than the Reed, but these will seldom be of se. N. Sischka quoted the Russian ornithologist Prof. L. A. Portenko saying that the length of the middle toe is 'very important', but . D. Harber tells me that *The Handbook of Birds of the Soviet Union* (edit- l by G. P. Dementiev and N. A. Gladkov) gives no details and I have ot so far located this reference. The character most often used to parate the two species is the position of the notch on the inner web of e second primary in relation to the tips of the inner primaries, but is requires to be measured with great accuracy and interpreted with eat caution. Taken with plumage colour, it should confirm the entification of adults with little difficulty, but it is now quite certain at many first-winter birds cannot be referred with confidence to ther species.

The Handbook of British Birds (presumably basing its remarks on

O. Kleinschmidt, who originally described the differences) gives for Reed Warbler: '2nd with a notch on inner web, falling usually between tip of 8th primary and secondaries, but very rarely as high as 7th primary'; and for Marsh Warbler: 'falling between tip of 6th and 8th and exceptionally 9th primaries'. It is not clear how the Reed Warblers with notch as high as 7th were identified (unless they were adults, which seems improbable), but oddly enough *The Handbook's* statement appears to be entirely accurate in the light of recent discoveries; subsequent work has, however, extended the observed range for Marsh Warblers and some are now known to have the notch as high as between the 5th and 6th primaries and once (in an adult) as low as below the 9th (N. Sischka).

When Kenneth Williamson took measurements for his B.T.O. Guide *Identification for Ringers, No. 1* (1960), he examined 50 Marsh Warblers, all of which had the notch falling between the 6th and 8th primaries, and 35 Reed Warblers of the typical form, twelve of which (all first-winter birds) had the notch between the 8th and 9th and the rest between the 9th and the secondaries. He stated that 'there is a possibility that a small degree of overlap (with Marsh) exists in the region of 8th-9th primaries'. Subsequently the work at Rye Meads, summarised by Messrs. Crudass and Devlin in their recent paper, has shown that a few adult Reed Warblers also have the notch falling as high as between the 8th and 9th, and, by remeasurement in later years of birds originally ringed as juveniles, they have confirmed that it falls slightly nearer the wing-tip in the first plumage than in later plumages. From this they have inferred, with good reason, that some first-winter Reeds must have the notch above the 8th and, indeed, they have now had two birds with this position (T. R. E. Devlin, *in litt.*) though unfortunately not established beyond all doubt to be locally-bred. Obviously, however, it is only a matter of time before they or other workers will recapture a ringed nestling with the notch above the 8th, and so confirm in the field what they have already demonstrated by statistical means.

A good many first-winter birds with the notch between the 7th and 8th have been identified as Marsh Warblers since 1960 (including several by myself), but it is now clear that these should not have been assigned to either species; though in localities where Reed Warblers are numerous the odds are heavily in favour of that species. However, there have been occasions, notably at the end of August and the beginning of September 1963, when first-winter birds with this notch-position (and one or two with the notch between the 6th and 7th) were so widely recorded between Fair Isle and Sussex that it cannot reasonably be doubted that Marsh Warblers were involved.

PETER DAVIS

Notes

Madeiran Little Shearwaters off Co. Donegal.—At 14.35 hours GMT on 22nd October 1964, from Malin Head, Co. Donegal, O.J.M. identified a Madeiran Little Shearwater *Procellaria baroli baroli* flying in a westerly direction. Ten minutes later it was followed by another. Each was under observation for approximately two minutes as it passed through an arc of about 130°, and at the closest point was just under 200 yards from him. Brief field notes were taken while the birds were actually in view and additional points were recorded immediately they were out of sight. These notes have been examined by Dr. W. R. P. Bourne, Sir Hugh Elliott and John Warham, all of whom have considerable experience of the species, and they all agree with the identification. In view of the fact that the seven previous British and Irish records of the Little Shearwater have been of ones washed up dead or dying, it seems worth giving the field-characters noted in some detail.

It was the flight that first attracted attention. This was a regular pattern of six or seven strong flaps followed by a short, stiff glide with only slight banking. In spite of the apparent strength of the wing-beat, the Little Shearwaters were travelling a great deal slower than the auks and larger shearwaters which were moving west at the same time. However, it was possible to compare them directly with Puffins *Fratercula arctica*, Manx Shearwaters *P. puffinus* and Sooty Shearwaters *P. grisea*. They were slightly smaller than the Puffins and more slender. The pattern of black above and white below and the typical shearwater shape (long, narrow, sharply pointed wings, slender body and fine bill) made them look very like miniature Manx Shearwaters. The bill was dark and the legs appeared so (certainly they were not pink as in the Manx Shearwater or orange as in the Puffin). All the under-parts, including the under tail-coverts, which were specially looked for, were pure white. The under surface of the wings was white or whitish in the centre but rather grey around the edges. The upper-parts were a uniform slate-grey. The division between the upper-parts and under-parts at the head and neck was not well defined, the black and white merging rather than abruptly meeting. In support of the colour details noted, it should be added that the light was such that one could distinguish between the 'blacks' of Guillemots *Uria aalge* and Razorbills *Alca torda* in flight.

The birds appeared after four days of light to moderate SE to SW winds, but at the time of observation the wind was NW force 9 (fortunately the observer was well sheltered). Very few shearwaters had been recorded since 8th October, but on the 22nd Manx and Sooty

Shearwaters were passing at the rate of eight and fourteen per hour respectively (figures which represent quite heavy movements for the north-west of Ireland in October).

In view of these records, two earlier but indeterminate observations from Malin Head seem worth adding. On 17th September 1963 a small shearwater was fairly well seen by O.J.M. at a range of half a mile and is thought very likely to have been a Little Shearwater. On 24th September 1964 T.R.E.D. recorded one very small shearwater passing west during a heavy movement of Manx Shearwaters and he believes that this may have been a Little Shearwater, but the range was too great for the salient features to be noted. It thus seems possible that this species is more regular on the Atlantic sea-board of Ireland than hitherto realised.

OSCAR J. MERNE and T. R. E. DEVLIN

[With the rejection of the several Little Shearwaters among the Hastings Rarities (see *Brit. Birds,* 55: 350), these are now the eighth and ninth records of this species (all of the Madeiran race) in the British Isles.—EDS.]

Little Bittern swimming.—On 10th August 1964, at Lake Fehér, near Szeged, Hungary, I disturbed a Little Bittern *Ixobrychus minutus* from a stand of reeds and, after flying over a strip of land and some more reeds, it came down on the lake with no more fuss than any bird which regularly swims. It floated fairly low in the water for rather less than a minute, looking something like a diver, then sprang up like a surface-feeding duck and flew off to some reeds several hundred yards away.

It is well known that Herons *Ardea cinerea* sometimes swim and presumably other members of the Ardeidae do so on occasion, but there seemed no particular reason for it in this case. The original distance flown was less than 50 yards and, as the bird was afterwards strong enough to fly many times as far, tiredness can hardly have been the cause. Our party had disturbed at least ten other Little Bitterns previously and all had landed again in the reeds. J. E. SQUIRE

Teal diving for food.—On 13th September 1963 I watched a female Teal *Anas crecca* diving regularly throughout the 30 minutes for which I was present at a flash near Sandbach, Cheshire. It spent an average of seven seconds underwater and the period between its dives varied from 15 to 45 seconds. The depth of water was not less than three or four feet and presumably the bird was diving to the bottom for food. Occasionally it reappeared with some green weed in its bill. The diving action was very smooth and involved no movement of the wings.

:any other Teal were present, but they made no attempt to dive.

It is well known that all duck are able to dive and many surface-eding species have been recorded doing so when injured, but I can ace no published account of prolonged foraging in this way by a Teal.

C. G. BENNETT

olitary Sandpiper in Lincolnshire.—On 10th August 1963, at the ugar Beet Factory settling ponds, Bardney, Lincolnshire, I had brief ews of a wader which was the size of a Wood Sandpiper *Tringa glareola*, ut which had dark central tail-feathers and the outer tail white barred ith dark brown. Later, watching it at a range of 15 yards, R. May, . F. Leachman and I were able to identify it as a Solitary Sandpiper *solitaria*. It was present for three days altogether and during that me was also seen by K. Atkin, G. Bundy, E. H. Clifton, R. K. Corn-allis, W. M. Peet, R. B. Wilkinson and several other observers. hroughout its stay it remained by a small stagnant pool, to which it ways returned when flushed.

The following description is based on notes made by K.A., G.B., K.C., R.M. and myself:

Forehead and crown medium brown; nape the same but minutely flecked with white; mantle and back brownish-grey finely spotted with white. Primaries darker brown with a dark area at the carpal joint. Rump and central tail-feathers same colour as rest of upper-parts; outer tail-feathers white with four or more dark bars extending outwards from the dark centre (these very noticeable in flight and also when settled); tail slightly rounded. An obscure superciliary stripe joined a conspicuous white orbital ring. Breast striated buff or brown and divided down the centre by a pale streak; flanks sparsely streaked; belly white; under tail-coverts white barred with brown. Under wing same colour as upper-parts. Eyes dark; bill dark olive with black tips to both mandibles; legs appeared dull yellow (in poor light greenish-yellow, R.M.).

The bird would tolerate observers for quite long periods, but was ometimes nervous and would then 'bob' in the manner of a Redshank . *totanus* before running into cover; this also occurred on one occasion hen a Heron *Ardea cinerea* flew over the pool. It was only once en feeding with another wader, a Redshank, against which it appeared ppreciably smaller. When feeding it moved like a Green Sandpiper . *ochropus* and not as quickly as a Wood Sandpiper, often standing otionless for a considerable time. It fed chiefly by taking insects om the surface of the water, but occasionally pulled a worm out of e mud in the manner of a Snipe *Gallinago gallinago*. Its usual call on eing flushed was a metallic *chit* or *click-click* (not unlike that of a Cross-ll *Loxia curvirostra* but higher-pitched, R.M.); the flight call was a *ee-chee* or *sweet-sweet* and on several occasions *sweet-sweet-sweet*. In ght it recalled a Green Sandpiper in that the upper and under surfaces

of the uniform brown wings were of the same shade, but it never appeared black-and-white (although the primaries were sooty, it was essentially a brown-and-white bird), and the outline was reminiscent of a Wood Sandpiper, but without the projecting feet. The flight was direct but the wing-beats were unhurried.

On 12th August an attempt was made to trap it, but this was unsuccessful and only served to unsettle it. It was last seen that evening, or rather heard calling continuously as it flew over the ponds in semi-darkness. A. D. Townsend

[This is the eighth British record of this American wader, excluding the four in the Hastings Area between 1904 and 1916 (see *Brit. Birds*, 55: 356), and it is the second in successive years, one having been ringed in Nottinghamshire in August 1962 (*Brit. Birds*, 56: 63-64). Photographs of the Nottinghamshire one were published last year (*Brit. Birds*, 57: plates 44a and 44b) and these illustrated the dark-centred rump and tail and the prominent white orbital ring which are among the main characters of the species.—Eds.]

Little Gull associating with feeding Razorbills.—On 22nd February 1965, from St. Ives Island, Cornwall, I watched an immature Little Gull *Larus minutus* flying just above three Razorbills *Alca torda* which were diving near some rocks. Frequently it would change position by about twelve to twenty yards and a second or so later one of the Razorbills would rise to the surface at that point. Evidently the gull was watching the underwater progress of the auks. Although it often fluttered a foot or so above them, it never actually attacked and, indeed, the Razorbills were not seen to bring food to the surface. From its persistent attention during the ten minutes I watched it, I had no doubt that it was at least watching for any edible debris resulting from their activities, though it is impossible to say whether it would actually have attempted to rob them if an opportunity had occurred. The Little Gull vigorously attacked and drove off a Black-headed Gull *L. ridibundus* which came to investigate. On several occasions the Razorbills rested on the surface for short periods and the Little Gull then settled near-by and waited until they dived again. S. G. Madge

Blue Tit feeding on pupae of Diptera in reed stem.—On 23rd January 1965, near Doncaster, Yorkshire, I saw a Blue Tit *Parus caeruleus* feeding from the inside of a broken stem of reed *Phragmites communis*. On investigation I found a cluster of about 25 pupae which the Doncaster Museum identified as those of a species of Diptera.
David Kramer

haffinch feeding on sugar.—On 27th July 1964, at Testwood, near outhampton, Hampshire, I saw a male Chaffinch *Fringilla coelebs* and so a male and two female House Sparrows *Passer domesticus* apparently ting white granulated sugar which had spilled from some bags on a ailer beside a sugar warehouse. The birds were certainly feeding d close inspection showed no foreign matter in the sugar.

P. J. PUCKERING

[House Sparrows often take sugar and it seems likely that other ecies do so when the opportunity occurs. Derek Goodwin tells that a café on Hampstead Heath, London, has had to put wire over e windows and covers on the sugar bowls to keep the sparrows out. EDS.]

Review

rds of Prey of the World. By Mary Louise Grossman and John amlet. Photographs by Shelly Grossman. Cassell, London, 65. 496 pages; 70 colour and 283 monochrome photographs; merous line drawings including 644 flight silhouettes and 422 nge maps; colour chart showing 82 shades of colour mentioned. 5 6s.

early 38 years ago, in a critical notice of the present reviewer's *How rds Live* (*Brit. Birds,* 21: 71-72), the formidable F. C. R. Jourdain nployed his immense personal knowledge to reassess in the light of eir worldwide behaviour and status some generalisations about birds prey derived from work in Britain and north-west Europe. The sulting controversy in *British Birds* (21: 100-103, 130-132) was fruitful demonstrating the need for a thorough and comprehensive survey the world's birds of prey, including their ecology, populations, od habits and territorial arrangements, and here, after nearly forty ars, it is. No one who knew Jourdain could have any illusions as to e sharply critical attitude with which he would tackle the task of viewing this work in turn if he were here to do it, but it would be urlish for his sparring partner in that exhilarating round not to begin warmly thanking the authors of this magnificent book for having d the boldness and imagination to undertake it, the industry and skill complete it, and the breadth of understanding and sympathy to do much justice both to the birds of prey themselves and to those men no through the ages from the earliest cultures and civilisations to odern biological research have felt their fascination and have worked improve human understanding of them.

The book consists of two parts. Part I, occupying the first third, made up of general chapters on 'Prehistory', 'Birds of Prey and Men',

'Ecology and Habits', 'Designs for Survival' and 'Conservation'. Part II describes and illustrates the world's 289 species of 'hawklike birds' and 133 species of owls, with miniature sketch-maps of their distribution. In judging the text it is important to bear in mind the authors' comment that the book 'was essentially visual in concept'. As such it ranks among the several outstanding recent works on the world's birds which have broken right away from the still widely prevalent Victorian concepts and techniques of illustrated book production, and have drawn fully on the riches of modern pictorial resources in colour and black-and-white photography, as well as in drawings and diagrams. Aided by first-class colour printing in West Germany, and by a wonderful selection of colour pictures often illustrating an entire series of actions in the course of catching prey, the authors have attained visually to the highest standards.

It can hardly be said that the text reaches the same level, although its merits are not inconsiderable. It represents a vast and apparently reasonably thorough search and digestion of the literature and, although one notices inaccuracies here and there, these are infrequent and not serious, so far as the present reviewer has been able to detect them. The writing is readable and, if some readers may wince at calling the Peregrine 'this streamlined prototype of the jet', the concessions to popularisation do not on the whole go beyond what is reasonable in a book which clearly cannot cover its costs out of sales to specialists in birds of prey.

For the same reason, and on account of the limitations of the authors' first-hand experience, it would be wrong to complain that so many of the observations described relate to North America, but, while appreciating how much it has been possible to achieve on that basis, one cannot help feeling that the inclusion in the team of at least one ornithologist with primarily African, Australasian or European experience would have markedly improved the balance and strengthened the authority of the work.

Another weakness is in the treatment of the ecological role of predators, an exceedingly difficult subject which could have been treated with more sophistication and grasp if as much trouble had been taken to secure specialist guidance as on the taxonomic, avicultural and cultural aspects. Despite valiant and sincere efforts this section sometimes falls into the very traps which it generally condemns, as when the authors on page 186 uncritically accept that, following myxomatosis in Britain 'Buzzards were forced to feed more heavily on game birds and domestic poultry'. The criticism of François Bourlière (not Bourliėse as printed) for his scepticism whether predators often control the numbers of their prey (page 118) is another instance of weakness on this aspect.

In Part II again many gaps and imperfections could be noted, but e reviewer's impression is that the great majority of these simply flect the inadequacy of our current knowledge, which such a work aturally underlines. Checking through a number of large raptors hich I have encountered, often only briefly, in one or other of six ntinents, I am impressed with the usefulness this work would have d for me if it had been available. In the case of the Solitary Eagle *arpyhaliaetus solitarius* of Central and South America, which is justly oted as 'apparently rare or difficult to find', snakes can be added to the od: in February 1964 F. C. Lehmann and I watched one of these grand gles eating one on the wing in Colombia.

The inclusion of a colour key or chart illustrating 82 different shades colour cited in the descriptions is a valuable tool within its obvious mits.

In view of its size and standard, and its dual value as a delightful ustrated work for bird-lovers and a reference book of lasting usefulss, *Birds of Prey of the World* is a very worthwhile purchase at its price, d a production in which its authors, illustrators, printers, binders and ublishers are all entitled to take pride. E. M. NICHOLSON

Letters

The first nesting of Spur-winged Plovers in Greece

rs,—In his recent article on the Spur-winged Plover *Hoplopterus inosus* (*Brit. Birds,* 58: 47-51), I. J. Ferguson-Lees stated that the eeding of this species in Europe as a whole and in Greece in particular as not authenticated until 1960, although 'suspicion grew to near rtainty in the 1950's'. It may be of interest, therefore, to put on cord that the 'Dutch Biological Expedition Turkey 1959', of which was a member, discovered a pair of Spur-winged Plovers and their st at Porto Lago, Greece, on 28th June 1959. Judging from eorge E. Watson's description and photographs (*J. Orn.,* 102: 301-7), the nest he found there the following year may have been in almost e identical spot. Our nest was empty, but the adults were extremely monstrative and near-by we found a dead chick about a week old. s we were not then aware of the importance of our discovery, the chick as unfortunately not preserved and the record has never been pubhed apart from a fleeting remark in the Dutch report on our expedion (*De Levende Natuur,* 64 suppl.: 26).

In Asiatic Turkey in 1959 we found Spur-winged Plovers nesting in vo places along the Mediterranean coast—near Antalya and in the eyhan delta east of Mersin. Furthermore, many records of breeding our-winged Plovers in Asiatic Turkey have recently been published

by H. Kumerloeve in his paper entitled 'Zur Sumpf- und Wasservogelfauna der Türkei' (*J. Orn.*, 105: 307-325, especially 318-319).

W. J. M. VADER

Sirs,—As a member of Dr. R. J. Raines's party which visited Greece in May 1960, I should like to point out that the dates for our stay given in the recent article on the Spur-winged Plover *Hoplopterus spinosus* (*Brit. Birds,* 58: 47-51) are incorrect and, in fact, refer to the second visit in 1961. In 1960 we were in Thrace from 2nd to 9th May and the Spur-winged Plover's nest containing four eggs was found by Alan Baldridge at Porto Lago on 4th May. By a remarkable coincidence, therefore, this nest was discovered on the same day as the one which George E. Watson found, also at Porto Lago, and published as the first European breeding record (*J. Orn.*, 102: 301-307), though, judging from his photographs and description of the site, the two were quite different.

PHILIP J. STEAD

[I am grateful to Mr. Stead for pointing out this error and must apologise to Dr. Raines for having confused the dates in his paper on the 1960 and 1961 visits to Greece (*Ibis,* 104: 490-502). This was inexcusable, though the mistake resulted from the fact that individual dates were not for the most part included in his section on the Spur-winged Plover, but were left to the reader to work out in general terms from the introductory text. In any case, however, the letter from Dr. W. J. M. Vader above shows that the question of who found the first nest in 1960 is now of lesser interest since breeding was, in fact, established in 1959.

A useful outcome of all this is that it gives me an opportunity of drawing attention to another interesting record which was published after my article went to press. On 8th August 1964 Einhard Bezzel (*J. Orn.*, 106: 111) observed a single Spur-winged Plover on a sandbank in the northern arm of the Danube delta—the first record for Rumania and nearly 120 miles further north than the previous northernmost one (in Bulgaria). This provides further evidence of the tendency to spread and emphasizes that the species is now worth watching for in any suitable marshland in the Balkans.—I.J.F.-L.]

Survival of Kingfishers in Cheshire during the severe winter of 1962/63

Sirs,—On page 420 of their paper on the effects of the severe winter of 1962/63 (*Brit. Birds,* 57: 373-434), H. M. Dobinson and A. J. Richards stated that the Kingfisher *Alcedo atthis* was probably the species worst affected. They added that 'most reports were of total extermination

ad none on questionnaires of anything but severe losses'.

However, an investigation of the breeding strength of Kingfishers in e eastern half of the Cheshire plain in 1963 showed that the species as present in 14 of the 16 localities covered. Each of these localities ad been favoured by Kingfishers in previous breeding seasons. The ces were scattered over a belt extending some 28 miles from Romiley, st of Stockport, to Worleston, west of Crewe. The maximum width the belt from east to west was about seven miles, between Middle-ich and Congleton. The waters concerned comprise lakes, rivers, reams and canals. These details were not forwarded to the organisers the national report because I unfortunately overlooked the requests r information.

Together with the known survival in apparently normal numbers a few Kingfishers on the Hampshire/Dorset border, the above result ads me to conclude that losses of this species may well have been er-estimated. It is difficult to postulate reasons for an apparently gh survival rate in eastern Cheshire. The rivers were never com-etely frozen, presumably because they flow faster in the eastern half, ing closer to the hills. This factor, however, must have been operat-e elsewhere in Britain. Two Kingfishers were found dead in March the extreme north-east of the belt, possibly the coldest part, and the ecies is still absent from these two localities. Apart from these dead es, there is no valid evidence as to the presence or absence of King-hers during the winter months concerned. A few negative reports sed on fleeting single visits by observers are available, but these are little significance.

Messrs. Dobinson and Richards also stated, most surprisingly, 'In itain, however, no food was available, since not only were the rivers ozen but also the shore within a Kingfisher's pouncing distance from y perch.' Yet the Hampshire/Dorset birds were present during the ld spell so some food was certainly available and it has already been dicated that even smaller rivers were not frozen. Furthermore, the ect of the industrial use of river and canal water by power stations d factories appears to have been overlooked. The water is returned polluted at a considerably higher temperature, quite precluding ezing and considerably stimulating fish. East Cheshire Kingfishers ould have to move at least as far as the Lancashire/Cheshire border to ke advantage of this factor. Countrywide the effect must have been importance. It should also be pointed out that Kingfishers do not quire a perch as a pre-requisite for feeding purposes. In coastal eas in winter they can frequently be seen hovering over tidal pools d gutters, and then diving when opportunity offers, hundreds of rds from any type of perch. I have even occasionally seen this mode feeding in summer habitats.

C. G. Bennett

[H. M. Dobinson has commented as follows: 'Mr. Bennett's record is clearly of great interest and it is a pity it was not available for analysis. His figures rank as category C and are therefore two categories better than the best of the 44 reports on the questionnaires. The only one of these 44 reports referring to Cheshire dealt with Carrington Moss and Rostherne Mere, where the population was said to have fallen from two pairs to nil. Eric Hardy, reporting on a large area in north-west England and Wales, also stated that there was a 'decided shortage' of Kingfishers, but we did not draw on this information in analysis owing to its general nature. It therefore seems more likely that Mr. Bennett has come across another pocket of good survival, rather than that the tenor of the 44 replies was wrong.

'We received no reports of Kingfishers taking food by hovering beyond the ice, and indeed the species was totally absent after January in the 23 localities for which we were sent winter records. Similarly, we received no reports of Kingfishers appearing on such rivers as were kept open by industrial use, which is in contrast to the situation observed for wildfowl. On the material available to us, therefore, there was no reason to think that Kingfishers took food by unusual methods or in unusual places and every reason to believe that numbers were extremely seriously reduced.'—EDS.]

Nutritional oedema as a possible cause of excess weights in severe weather

Sirs,—I read with much interest the paper by H. M. Dobinson and A. J. Richards on 'The effects of the severe winter of 1962/63 on birds in Britain' (*Brit. Birds*, 57: 373-434). In it, on pages 398-399, they briefly discussed the fact that, even when famine conditions prevailed, some birds trapped had 'weights greatly in excess of the normal winter maxima'. Being a paediatrician, I thought at once of the nutritional oedema which occurs in starved human infants fed on dilute cereal brews instead of milk, and also of the oedema which may appear as a result of chilling. I wonder whether the authors considered the possibility that the high bird weights they mentioned were due to fluid retention with or without oedema?

So-called nutritional oedema in humans, also termed hunger oedema, famine oedema and war oedema, appears to be caused by various factors, probably in different combinations. Protein deficiency, with a resulting fall in the albumen of the blood, has been present in many cases. Other factors incriminated have been deficiencies in the vitamin B complex, and the amounts of water and salt ingested.

On the face of it, with so many birds dying from starvation and cold, I would suppose hunger oedema might well develop among them, as it

ould in a human population in such conditions. For birds to put on eight in excess of normal by laying down extra fat in a period of mine would seem astonishing. H. M. M. Mackay

[H. M. Dobinson has commented as follows: 'We did not consider e possibility of oedema at the time and Dr. Mackay's suggestion is a ry interesting one. However, we think it much more likely that the tra weight was, in fact, caused by the deposition of fat, as the birds ncerned were all in excellent condition. The matter is being more lly discussed in a paper on the weights of Greenfinches *Chloris chloris* M. E. Griffiths and K. Cooper, which is now in preparation and hich we hope will be published later this year.'—Eds.]

News and comment

Edited by Raymond Cordero

ndiminished threat to birds of prey.—The Joint Committee of the British ust for Ornithology and the Royal Society for the Protection of Birds on Toxic emicals is still alarmed by the serious threat to several of Britain's birds of prey om sheep dips containing organo-chlorine pesticides. It has told the Advisory mmittee of the Ministry of Agriculture that it is essential that these dips should made illegal and that the present voluntary ban on the uses of certain organo-lorine pesticides should be replaced by a compulsory one. The latest figures ow another sharp increase—from 57 of 11 species in 1962-63 to 82 of 13 species in 63-64—in the number of birds of prey submitted for analysis. In its evidence the int Committee says that, while welcoming limited restrictions imposed last year on rtain uses of aldrin, dieldrin, endrin and heptachlor, it feels there are several weak-sses in the present system, especially its voluntary basis. With the continued use less toxic organo-chlorines, such as DDT and BHC, the dangerous build-up takes ace more slowly, but the long-term effects may be equally serious. The Joint mmittee has also received disquieting evidence from many counties that farmers ve laid in several years' supply of dieldrin dips.

eservation progress in Belgium and France.—Long, patient work by two tional Sections of the International Council for Bird Preservation has resulted in yal and governmental decrees in Belgium and France respectively, which represent portant advances in bird preservation.

In Belgium the new measures include the complete protection of all nocturnal d most diurnal birds of prey; among the latter are all eagles (*Aquila, Hieraëtus, liaëtus* and *Circaëtus*), buzzards and kites, and the Honey Buzzard, Osprey, Pere-ne and Kestrel. A large number of other birds are also given complete protec-n, including the Bee-eater, Kingfisher, Roller, Cuckoo, Robin, Wren and all ikes. Similar protection is accorded to their eggs and young. Strict control is posed on the stuffing and setting up of birds and taxidermists may no longer be possession of protected species. Public bird markets are prohibited and the port, export or transit of indigenous species is forbidden. The catching of birds

by nets and snares is reduced and commercial netting, it is reported, has been virtually abolished.

Meanwhile, in France all eagles (including the White-tailed) and the Eagle Owl are now protected throughout the year in every department, and the protection previously accorded to all vultures (including the Lammergeier) and the Short-toed Eagle is continued. It is forbidden to destroy not only all the large diurnal birds of prey but also all nocturnal species. Monsieur J.-F. Terrasse, in supplying details to the Secretariat of the International Council for Bird Preservation, points out that there is still a long way to go, 'for as long as rewards are given for the destruction of birds with "hooked beaks" and the pole-trap and *chasse au Grand-Duc* (shooting with an Eagle Owl decoy) are not prohibited, it is unrealistic to protect certain species.'

British-bred Eagle Owls for Sweden.—As a result of a conversation with Kai Curry-Lindahl at the Working Conference on Birds of Prey and Owls at Caen, France, in 1964, Philip Wayre has presented a pair of young Eagle Owls to the Swedish authorities to assist in their scheme to re-establish this species in areas of forest where it has been exterminated in the past by shooting. These two birds, which were reared in the Norfolk Wildlife Park last summer, were flown to Sweden in December and will be accommodated in a large aviary in the forest. When they eventually breed the progeny will be released once they are full grown, although they will continue to be fed near the aviary for several months; during this time they will wander out into the surrounding forest and ultimately take up a wild existence. The parent birds are never released as they would be unable to fend for themselves. The Swedes have discovered that this method works very well and that releasing young aviary-bred Eagle Owls attracts wild ones into the area.

One of the pairs of Eagle Owls in the Norfolk Wildlife Park started breeding again in March this year and, if they are successful, their young will also be sent to Sweden.

Presentation to Miss Barclay-Smith.—At the annual meeting of the British Section of the International Council for Bird Preservation on 10th March, the chairman, Dr. W. H. Thorpe, presented a bird painting to Miss Phyllis Barclay-Smith, the section secretary for some thirty years, as a 'token of all that she is and does for us'. The subject of the painting, which was by Ralph Thompson, was Secretary Birds. This species was chosen because it is characteristic of a country of which Miss Barclay-Smith is extremely fond and because, in the experience of the chairman, it is 'seldom idle; though seemingly unhurried, it is nevertheless highly efficient. It seems able to organise its life so that it does not get into a flap.' Dr. Thorpe concluded by expressing the hope that Miss Barclay-Smith would continue her work for the I.C.B.P. for very many years to come.

World conference of the I.C.B.P.—The XIV World Conference of the International Council for Bird Preservation will be held in Cambridge from 11th to 15th July 1966, just before the Scottish cruise and Oxford meeting of the XIV International Ornithological Congress (see *Brit. Birds,* 58: 156-157).

New B.O.U. president.—At the Annual General Meeting of the British Ornithologists' Union in Scarborough, Yorkshire, on 2nd April, Prof. V. C. Wynne-Edwards was elected president in place of R. E. Moreau, who retired at the conclusion of his term of office; H. N. Southern was elected vice-president in place of Prof. Wynne-Edwards; and Dr. W. J. Eggeling and Dr. D. W. Snow were elected members of council in place of Dr. C. J. F. Coombs and Dr. G. V. T. Matthews, who retired in rotation.

Notice to Contributors

tish Birds publishes material dealing with original observations on the birds of tain and western Europe, or, where appropriate, on birds of this area as observed other parts of their range. Except for records of rarities, papers and notes are mally accepted only on condition that the material is not being offered to any er journal. Photographs (glossy prints showing good contrast) and sketches are comed. Proofs of all contributions are sent to authors before publication.

After publication, 25 separates of papers are sent free to authors (two or more hors of one paper receive 15 copies each); additional copies, for which a charge nade, can be provided if ordered when the proofs are returned.

Papers should be typewritten with double spacing, and on one side of the sheet y. Shorter contributions, if not typed, must be clearly written and well spaced.

Notes should be worded as concisely as possible, and drawn up in the form in ich they will be printed, with signature in block capitals and the writer's address rly written on the same sheet. If more than one note is submitted, each should on a separate sheet, with signature and address repeated.

Certain conventions of style and layout are essential to preserve the uniformity ny publication. Authors of papers in particular, especially of those containing ematic lists, reference lists, tables, etc., should consult the ones in this issue as a de to general presentation. English names of species should have capital ials for each word, except after a hyphen (e.g. Willow Warbler, Black-tailed dwit), but group terms should not (e.g. warblers, godwits). English names are se used in *The Handbook of British Birds*, with the exception of the changes listed in *ish Birds* in January 1953 (46: 2-3). The scientific name of each species should underlined (but not put in brackets) immediately after the first mention of the glish name. Subspecific names should not be used except where they are vant to the discussion. It is sometimes more convenient to list scientific nes in an appendix. Dates should take the form '1st January 1965' and no er, except in tables where they may be abbreviated to '1st Jan.', 'Jan. 1st', or n 'Jan. 1', whichever most suits the layout of the table concerned. It is particuy requested that authors should pay attention to reference lists, which otherwise se much unnecessary work. These should take the following form:

CKER, B. W. (1949): 'Species and subspecies: a review for general ornithologists'. *Brit. Birds,* 42: 129-134.

THERBY, H. F. (1894): *Forest Birds: Their Haunts and Habits.* London. p. 34.

ious other conventions concerning references, including their use in the text, uld be noted by consulting examples in this issue.

Tables should be numbered with arabic numerals, and the title typed above in style used in this issue. They must either fit into the width of a page, or be igned to fit a whole page lengthways. All tables should be self-explanatory.

Figures should be numbered with arabic numerals, and the captions typed on a rate sheet. All line-drawings should be in indian ink on good quality drawing er (not of an absorbent nature) or, where necessary, on graph paper, but this st be light blue or very pale grey. It is always most important to consider how n drawing will fit into the page. The neat insertion of lettering, numbers, ows, etc., is perhaps the most difficult part of indian ink drawing and, unless he had considerable experience of this kind of work, an author should seek the of a skilled draughtsman.

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British Birds

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A count of the Gannets on Grassholm in 1964

By John H. Barrett and M. P. Harris

Field Studies Council

(Plates 33-34)

INTRODUCTION

A COLONY OF Gannets *Sula bassana* has been known on Grassholm, off the Pembrokeshire coast, since at least the 1860's. The information published about it before 1939 was summarised by Fisher and Vevers (1943). This short paper brings together the more recent counts and gives details of the colony in 1964, without any attempt to explain why the numbers continue to increase and seem as if they will go on doing so.

THE 1964 COUNT

The 1964 count was made from the clearest of a series of some twenty aerial photographs taken in mid-June from about 2,000 feet (plate 33). Examination of this photograph shows so little disturbance by the aircraft that the great majority of the nests have the birds in occupation. The area seen in the photograph to be covered by Gannets is much larger than the area taken up by nests, which is typified by the extremely regular spacing of the white dots. This nesting area was later marked on a big enlargement of the photograph during an actual visit to Grassholm. It was then that about thirty additional nests were spotted to the south-west of the main area.

As seen on the enlargement the colony measured 14 inches by four inches. Counting was done under a lens: not only could individual nests then be separated, but it was even clear if one or two birds were associated with each nest. Only attended nests were counted and these were immediately blocked out on the print to avoid duplication. The total count came to 15,528 nests. The only element of inaccuracy is in the demarcation of the nest area on the print, but this, we believe, did not exceed 2% at most.

HISTORY OF THE GROWTH

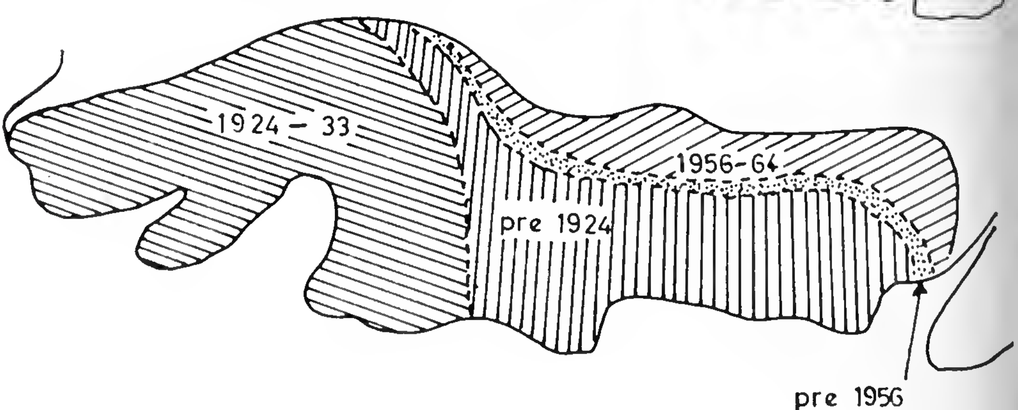
During the 1860's Gannets were nesting on Grassholm in 'very small numbers'. In the following summary of the subsequent counts, the information up to and including 1939 is from Fisher and Vevers (1943), for 1946-48 from Fisher and Vevers (1951), for 1949 from the Skokholm Bird Observatory Report and for 1956 from Lockley (1957):

1883	20 pairs	**1937**	about 5,000 pairs
1890	200+ pairs	**1939**	about 6,000 pairs
1895	abo 300 pairs	**1946**	about 6,000 pairs
1905	about 300 pairs	**1947**	about 6,100 pairs
1914	less than 300 pairs	**1948**	7,000 pairs
1922	800-1,000 pairs	**1949**	9,500 pairs ±13%
1924	1,800-2,000 pairs	**1956**	10,550 pairs
1933	about 4,750 pairs	**1964**	about 15,500 pairs

CHANGES IN THE AREA OCCUPIED

Several photographs used for making counts on Grassholm have been published (Acland and Salmon 1924, Salmon and Lockley 1933, Lockley 1957) and fig. 1 is based on these. Since the views are somewhat different in each case, our compilation on to the semi-profile used in the 1964 count must be inaccurate to some extent, especially along the south-east boundary which is not on the 1933 photographs. Since 1924-33 there has been very little expansion to the south-east where the boundary is marked by the crest of a steep ridge over the top of which the colony shows no sign of spreading (plate 34), even though small hollows cutting back into the ridge have been occupied.

FIG. 1. Diagrammatic representation (oblique view) of the spread of the Gannets *Sula bassana* on Grassholm, Pembrokeshire: there has been no extension to the south-east since 1924-33, when they reached the ridge which is plainly visible on plate 34. The small inset shows (in solid black) the position of the colony in relation to the island as a whole



ACKNOWLEDGEMENTS

We are most grateful to Admiral Sir Nigel Henderson, R.N., and Captain Ian Campbell, R.N., who at the time were respectively Commander-in-Chief at Plymouth and Commanding Officer at Brawdy and who were responsible for having the photographs taken.

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Studies of less familiar birds

134. Black Vulture

Photographs by P. van Groenendael aud Guy Mountfort

(Plates 35-38)

THE VULTURES OF the Old World are found chiefly in Africa and southern Asia. There are fourteen species in all, fairly equally divided between the two continents, and four of them also breed in southern Europe. The commonest and most widespread of these are the Griffon *Gyps fulvus* and the Egyptian Vulture *Neophron percnopterus.* Much rarer are the Lammergeier *Gypaëtus barbatus* and the subject of these photographs, the Black Vulture *Aegypius monachus.* The last is at once the biggest in bulk of the European quartet and the least known. Also called the Cinereous Vulture, it has no connection with the American Black Vulture *Coragyps atratus.* American vultures, in fact, though resembling the Old World ones superficially in appearance and habits, are quite distinct structurally and belong to a separate family of their own, the Cathartidae.

Vultures are certainly declining in Europe where the interests of land development and modern hygiene are working steadily against them, to say nothing of the effects of disturbance and the poisoning of carcases. So far as Europe is concerned, in fact, Black Vultures are probably now rare everywhere except in southern Russia and Spain, but even in the latter country it is unusual to see more than half a

dozen together, compared with flocks of over 100 Griffons. Plate 37 shows four Black Vultures feeding with Griffons on the carcase of a calf and plate 38b provides a useful size comparison between the Black, the Griffon and the Egyptian. Both these photographs were taken in the Coto Doñana in southern Spain, and it is in the marismas there that the species is probably more easily seen than anywhere else in western Europe.

The Black Vulture's real strongholds, however, are the arid steppes and highlands of central Asia. There it holds sway over all the other carrion-eating birds of prey. Meinertzhagen (1954) recorded both Griffons and Rüppell's Vultures *G. rüppellii* making way for it at carcases; he also saw blood streaming from the neck of a Griffon which presumed to share a camel with a Black Vulture. It is, in fact, the heaviest and strongest of the Old World vultures with the possible exception of its African counterpart, the Lappet-faced Vulture *Torgos tracheliotus*. The Black Vulture's breeding range extends as far east and north as western China and Inner Mongolia where it is found at almost the same latitude as southern England. It is thus the most northerly of the Palearctic vultures and it also occurs to an altitude of 10,000 feet or more in the Himalayas and elsewhere. It is largely sedentary, even in the harsh winters of Tibet and Mongolia, though some individuals appear to move down into the Chinese lowlands in the coldest part of the year.

In Europe, and at least some other parts of its range, the Black Vulture differs from the Griffon, Egyptian and Lammergeier in nesting very rarely on cliffs. Instead it appears to need good-sized isolated trees (often oaks or pines) and the site shown on plate 38a is probably fairly typical. This was one of four nests, three of them occupied, which P. van Groenendael found in May 1964 on a Spanish mountain slope covered with dense thickets interspersed with scattered cork oaks. The nests were a few kilometres from each other in the crowns of cork oaks 25 to 30 feet high. Plate 38a and also the photograph of the Black Vulture planing in to land (plate 36) were taken from higher up the slope above one of these nests. On the other hand, much lower trees are used in Asia and cliff nests are evidently more frequent in some parts of that continent. For example, Meinertzhagen (1954) described finding a nest in a stunted juniper only 15 feet high in Baluchistan and he recorded that in that country, where nests may be as little as 40 to 50 yards apart, the species utilises both trees and ledges. The nest itself is usually a huge structure of dead branches lined with small twigs, vegetable matter and wool. Almost invariably only one egg is laid. The incubation and fledging periods are imperfectly known, but, as is the case with most of the Old World vultures, the egg probably takes about seven weeks to hatch and the youngster may

en spend three to four months in the nest. The nest photographed y van Groenendael held a small, downy chick in May; the nestling own in this species is smoky-grey in colour.

Plate 35 gives a good impression of the species. The entire plumage oks black from a distance, particularly in immature birds, but in fact e feathers are blackish-brown, darkest on the primaries and second-ies and on the thighs. The neck ruff is blackish-brown in young rds and becomes paler with increasing age until it is pale brown or en whitish-brown. The head is a combination of pale mauve cere, re blue skin and short brown down becoming whitish on the nape; e beak is dark horn, the eyes are brown and the legs white but mostly vered with long black feathers (plate 36). The sexes are similar in e and coloration. In flight the Black Vulture is very like a dark riffon without the same contrast between ruff and body plumage and tween wing-coverts and flight feathers. It also has a more wedge-aped tail (which may, however, be worn down as a result of being agged along the ground during feeding). It has a noticeably larger ad than the Griffon, and a deeper and altogether more massive bill hich is well illustrated in plate 35 and can be compared with that of e Griffon in plates 37 and 38b.

With a total length of two or three inches over three feet, a wing-an of about nine feet and at least one recorded weight of 27.5 lbs., e Black Vulture is among the largest and heaviest of flying birds; it eighs even more than albatrosses and condors and less only than rtain species of such groups as swans, cranes, bustards and pelicans e Fisher and Peterson 1964). Its food consists almost exclusively carrion ranging from entrails to flesh and even bones, but there are ferences in the literature to its also feeding on tortoises, steppe armots and lambs (see, for example, Voous 1960, Meinertzhagen 54). Incidentally, Meinertzhagen noted that, in spite of its bulk, a ounded Black Vulture may run almost as fast as a man.

Although its normal range in Europe extends no further north than e southern Pyrenees and Carpathians (where it is probably now nost extinct), the Black Vulture has occasionally wandered as far as e Baltic States and Denmark, and in October 1948 a female was shot near to Britain as the Netherlands (de Reuver 1955).

I. J. FERGUSON-LEES

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Courtship display in the Waxwing

By F. M. Meaden and C. J. O. Harrison

(Plate 39)

Apart from observations made during irruptive dispersals outside the breeding season, little information is available on the behaviour of the Waxwing *Bombycilla garrulus*. As a species which lives in sub-arctic pine forest and has relatively quiet and unspectacular habits, it is likely to escape notice. F. M. M. has kept a small group of individuals under aviary conditions for several years, during which time nests have been built and eggs laid, and one young one reared to maturity. It has been found that, before nesting, these birds indulge in a courtship display which does not appear to have been recorded for this species, although a similar ceremony has been noted as 'play' in the Cedar Waxwing *B. cedrorum* (Bent 1950).

Although normally rather silent, F.M.M.'s birds have periods of activity during which they frequently utter a short high-pitched trill, *tsee-ee-ee, tsee-ee-ee,* that suggests the type of call used by a small nestling begging for food and seems to function as a contact call or flock note. At other times, especially after feeding when their behaviour is more sluggish, they may remain silent for long periods. They are sociable, but not a contact species, maintaining an individual distance of an inch or two. About May some indication of breeding activity becomes apparent, and there is an upsurge of agonistic activity which is not apparent at other times.

Although the sexes appear alike, the male can be identified at close quarters by his longer crest and brighter wing colouring, and at times the sex can be tentatively determined by the behaviour. In the following notes the sex of individuals has been indicated where known.

Sociability does not break down completely at the nesting period, but the males show some signs of rivalry, apparently competing for the attention of the females, while the latter may occasionally quarrel over nesting sites. When the hens are sitting the males show limited territorial aggression in the immediate vicinity of the nest. Aggressiveness is indicated by a posture in which one bird perches upright near another, with all its feathers and its crest sleeked down, making it appear tall and thin. The bill is raised slightly and the dark throat patch becomes very apparent. Overt aggressive behaviour may follow. This usually takes the form of gaping at the adjacent bird, or of opening and closing the bill, often with a loud snapping, while

aning towards it in a typical forward-threat posture; the attack is rected at the head, but there is little sign of real pecking.

The courtship display posture is the antithesis of the aggressive osture, the axis of the body being horizontal and the feathers erected ther than sleeked. In its simplest form the male hops towards the male and displays when a few inches from her. He depresses his il and erects the feathers of his lower back, rump and upper tail-verts to form a smooth continuous hump, above the level of the back part and looking rather like the outline of a cockerel's tail (plate b). At the same time he raises the feathers on his belly and under l-coverts in similar fashion, which makes him appear much larger d shorter-legged. As he erects his feathers, he pivots the foreparts his body a little towards the female, at the same time turning his head ghtly away (plate 39c). His crest is erected to an almost vertical sition. The whole effect is that of a momentary swagger in which s shoulder is pushed towards the female. As he turns his head away, bends his closed tail laterally towards the female in a posture similar the 'tail-twist' which occurs in the displays of the waxbills (Estrildi-e) and the Bullfinch *Pyrrhula pyrrhula.* If she is responsive and ows signs of erecting her feathers in similar fashion, a 'gift-passing' remony may follow.

In this ceremony the pair perch near one another and may face in the me or opposite directions. In the low intensity form of this display plumage of both is erected in the manner described. The male has his bill a small object which may be a morsel of food but may equally ll be something inedible which he has picked up just before ap-oaching the female. He stretches up his neck so that he is looking wn at the female (plate 39a), who is crouching slightly with bill sed, and deliberately places the object in her open bill. The two ds then hop apart and relax the plumage a little. They remain otionless, then a second or two later they move together again, take the same posture, and the ceremony is repeated with the roles re-rsed. This passing backwards and forwards of the 'gift' may con-ue and has been seen to take place up to fourteen times in succession. is performed silently and with an air of solemn deliberation. It pears usually to be self-exhausting and does not normally lead to mediate subsequent sexual behaviour. Copulation is seen only at e intervals and may occur after perhaps one display in ten.

In the high-intensity version of the ceremony the erection of feathers greater and may involve those of the mantle and breast to some gree, so that from the side the birds appear almost spherical but for short down-pointing tail, the stiffly erected crest and the head parated by the short slender neck. In all the displays the birds ap-ar laterally flattened when seen from the front, the wings being held

against the sides, and it seems to be the dorsal and ventral feather tracts which are erected to present as great a surface area as possible from the side view. In this respect the display resembles some postures of the Jay *Garrulus glandarius* (Goodwin 1956) and the Red Avadavat *Amandava amandava* (Kunkel 1961). These displays occur in complete silence, without special vocalisation. Just before the display, however, the male is often heard uttering a soft *zutt*, this being very similar to the call used by the hen when about to feed her nestlings.

The displays appear to be linked with pairing-up and pair-bond maintenance. They normally involve only two birds, but on one occasion, when a pair were performing the gift-passing ceremony, another hen, perching only an inch or two away and previously ignored erected her feathers in similar fashion, whereupon she was threatened by the hen of the pair already displaying. True courtship feeding occurs fairly often during the breeding season without any sign of this display, which appears to be a highly ritualised ceremony derived from courtship feeding but now quite independent of it.

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Bobolink in the Isles of Scilly: a bird new to Great Britain and Ireland

By J. L. F. Parslow and M. J. Carter

St. Agnes Bird Observatory

(Plate 40)

In the early morning of 19th September 1962 F. H. D. Hicks discovered an unfamiliar, bunting-like bird in an area of bracken and small grass fields on St. Agnes, Isles of Scilly. Realising that it was something unusual he immediately ran back to the observatory where he found M.J.C.; together they returned to the spot and quickly located the bird again. After watching it for about half-an-hour they were joined by J. A. Burton. A mist-net was then erected and soon afterwards the bird was trapped and taken back to the observatory for examination and ringing. In the hand it was also seen by M. J. Cowlard, J. Cooke, P. Lever, T. H. Levere, Miss H. M. Quick and all

ıterested islanders. It was kept overnight and released next morning, ut was not seen again. It subsequently proved to be a Bobolink *olichonyx oryzivorus,* a North American species not previously recorded ı Great Britain and Ireland. Indeed, apart from two undated and enerally unaccepted records from Heligoland (Alexander and Fitter 955), this is the first occasion on which the species has occurred in urope.

LABORATORY DESCRIPTION

lumage

ı the field the bird's most marked feature had been its striped head attern. This was also very apparent in the hand and comprised a llow central crown stripe, 4 mm. wide, running from the bill almost the nape, bordered on each side of the crown by a broad black band he individual feathers of which were narrowly edged with yellow), a road yellow supercilium, and a dark line which extended for 8 mm. hind the eye. The nape was brownish, very finely streaked. The enerally yellowish-brown upper-parts were very streaked with ackish-brown and buff. Individual feathers of the mantle were ive-yellow with blackish mesial bands, those of the back and scapu- rs being similar but with the former narrowly fringed ginger and the tter broadly edged ginger-olive. The feathers of the rump were ive (again with black centres), becoming olive-brown with narrow ack mesial streaks on the upper tail-coverts. These latter, like the ıder tail-coverts, extended to within 25 mm. of the tip of the tail. he bird's under-parts were predominantly yellowish, brightest on the roat and breast, much paler on the chin, and palest on the belly which as really whitish and only faintly washed with yellow. There were int buffish streaks on the upper breast, forming an indistinct pectoral nd. Darker streaks on the sides of the breast and particularly the nks and under tail-coverts were formed by black centres to some of e feathers, the amount of black on each becoming progressively eater towards the under tail-coverts. On the upper wing, the pri- ary coverts were dark brown, narrowly fringed with lighter brown or iff. The remiges were of a similar but rather paler colour, except for e innermost secondaries, the centres of which were almost black. he wing coverts and alula were very dark, almost black; the greater verts were bordered yellowish on the outer webs, the median verts were tipped yellowish, and the bastard wing was narrowly dged whitish. The surface of the under wing was silver-grey.

ft parts

ointed, conical bill, with upper mandible reddish-horn tipped dark, ıd lower mandible pale horn; gape pink. Feet and legs pinkish- own. Eyes dark brown.

Structure and measurements

Second and 3rd primaries equal and longest; 4th shorter by 4 mm.; 5th, 6th and 7th shorter by 9, 14 and 19 mm. respectively; 10th shorter by about 30 mm.; 1st primary minute. Third and 4th primaries emarginated. Tail rounded, the outer retrices being 7 mm. shorter than the central pair; each tail feather sharply pointed at tip. The following measurements were taken: wing 94.5 mm.,.bill 16 mm. (width 6.5 mm. at nostrils), tail 67 mm., tarsus 25.5 mm., hind claw 12 mm. The weight was 39.5 gm.

FIELD NOTES AND IDENTIFICATION

The Bobolink was found in an area close to the Pool on St. Agnes where it frequented some small grass fields, much overgrown with bracken and bordered by low dry-stone walls. Here it seemed quite at home and during the period it was under observation it remained either in the bracken or perched on a stone wall or rock. Apart from a brief spell of sunbathing, its only activity was catching flying insects, which it did by sallying upwards from its perch on the wall or from the top of a bracken frond, on which it appeared rather ungainly and unstable. Other passerine species, such as Starlings *Sturnus vulgaris*, were also flycatching, though not in the same area.

The observers' first impressions were of a bunting-like bird, predominantly yellow in bright sunlight but seeming rather browner above when the sun clouded over, appearing heavier than a Corn Bunting *Emberiza calandra* and slightly bigger than a large Wheatear *Oenanthe oenanthe* alongside which it once perched. Its body seemed disproportionately long compared with the wings and head, and the tail looked short in flight, when it was always fanned. At rest, the closed wings did not reach to the tips of the upper tail-coverts and the diagnostic pointed tail-feathers were clearly visible at moderate ranges. It had a short, bunting-like bill which merged with the forehead to form a straight profile. The most distinctive feature was its striped black and yellow head pattern, described earlier, which was somewhat reminiscent of that of an Aquatic Warbler *Acrocephalus paludicola*. Owing to the yellow and black streaking of the wing coverts and scapulars, and the yellow then black lines (formed by the longer scapulars) which extended down each side of the mantle, the general appearance of the upper-parts was very streaked, like that of a Reed Bunting *Emberiza schoeniclus*. Its under-parts were mainly yellowish or yellowish-buff with a brownish tint on the breast caused by a faint pectoral band of buffish streaks, and there were a few dark streaks on the flanks. The bird uttered a soft sparrow-like call-note, *cheep* or *chuck*, when flushed.

The question of identification posed quite a problem since the

female Bobolink, which the autumn and winter males resemble, is not clearly described or illustrated in Peterson (1947)—the only American reference book available at the time. Moreover, the bird's general appearance was so similar to a bunting that it was thought to belong to the genus *Emberiza,* the striped head pattern and yellowish under-parts suggesting a female or immature Yellow-breasted Bunting *E. aureola.* However, it was soon realised that its large size and the pointed tail-feathers, as well as the lack of white in the wings and tail, precluded this possibility. After returning to the mainland a few days later, ..J.C. was able to examine several reference books and realised the bird had been a Bobolink; this was confirmed on 25th September when he and J. A. Burton examined skins of this and other species at the British Museum (Natural History).

All Bobolinks in autumn, regardless of sex or age, have a similar streaked buffish plumage. Males, however, are larger than females and the measurements of the St. Agnes individual show that it was a male. Ridgway (1902) gives the average measurements of 20 adult male and eight adult female Bobolinks as, respectively, wing 97.5 and 87.4 mm., tail 65.3 and 61.0 mm., and bill 15.5 and 15.0 mm. His small sample of females showed the following maxima: wing 89.7 mm., tail 64.5 mm. and bill 15.5 mm., all of which are smaller than the measurements of the St. Agnes bird. First-winter birds are more yellowish beneath than adults. Also, according to Dwight (1900), adult male Bobolinks in winter plumage have a few black feathers, usually yellow-tipped, irregularly scattered on the chin and breast. The St. Agnes individual lacked this character and was also very yellowish on the under-parts, and it is concluded that it was in first-winter plumage.

WEIGHT AND CONDITION ON CAPTURE

At the time of its spring and autumn migration through North America, the Bobolink characteristically deposits a remarkable amount of subcutaneous fat. For example, all of the 17 adults killed at a television tower in Illinois during nocturnal migration in the second half of September 1958-60 were extremely fat and averaged 46.2 gm., the ten males in the sample having a mean weight of 50.7 gm. (Graber and Graber 1962). These figures compare with an average fat-free weight of 24.04 gm. calculated for ten male Bobolinks by Connell *et al.* (1960), and with an average weight of 28.5 gm. for ten unsexed autumn migrants at a coastal netting station in New Jersey, where most migrant passerines come in from over the ocean and have very little fat on arrival (Murray and Jehl 1964). In mid-afternoon, shortly after its capture, the St. Agnes bird weighed 39.5 gm. and this relatively high weight strongly suggests that it had not just completed a long oceanic flight across the Atlantic. The fact that it appeared strong and

healthy and showed no sign of fatigue in the field supports this view. Further, the synoptic situation immediately preceding its appearance was clearly unsuitable for unaided crossing of the Atlantic (other birds trapped on St. Agnes the same day included two eastern species, a Greenish Warbler *Phylloscopus trochiloides* and a Red-breasted Flycatcher *Muscicapa parva*) and it must be presumed that either the Bobolink was not newly arrived from America or that it had made all or part of its journey on a ship where it found considerable sustenance.

NOTES ON THE SPECIES

The Bobolink comprises a monotypic genus within that varied and essentially tropical New World family, the Icteridae. Almost twenty members of this group breed in North America, the majority being resident or only short distance migrants; but three perform long distance migrations across the Gulf of Mexico to winter in central or southern South America. Of these three, the Baltimore Oriole *Icterus galbula* and now the Bobolink have occurred in Britain for the first time in recent years, while the third, the Orchard Oriole *Icterus spurius,* has yet to be recorded in Europe.

The breeding range of the Bobolink is mainly confined to a belt about 500 miles wide, extending from New Brunswick and Nova Scotia south to New Jersey on the Atlantic coast, westwards across the northern United States and southern Canada as far as Nebraska and the plains of Saskatchewan, with some localised and very isolated populations still farther west (A.O.U. 1957, Hamilton 1962). In the breeding season it is a bird of open dry country or damp pastures and in parts of its range is much dependent on an agriculture which produces open hay or clover fields. A general decline in agriculture and changes in farming practice, in particular the more mechanised and earlier mowing of hay crops, are said to have caused a decrease in the species in certain eastern states during the present century (Todd 1940, Palmer 1949, Griscom and Snyder 1955). Its food in summer consists mainly of insects (especially beetles, caterpillars and grasshoppers), but from August and September onwards increasing amounts of weed seeds and some grain are taken, and seeds provide the main food during the rest of the year (Beal 1900, Forbush 1927). In the southern States, migrants formerly caused extensive damage to rice crops and were slaughtered in immense numbers both for market and to protect the crops (Forbush 1927).

The males usually arrive in the breeding areas in the latter half of May a few days before the females, and have a dynamic, exuberant song, almost always given in flight and sometimes in company with other males. Their colourful and distinctive piebald breeding dress, entirely black beneath and with large areas of white above on the rump,

ıck and scapulars (plate 40a), is in sharp contrast with their more ›ber plumage in autumn and winter which then resembles that of the male (plate 40b). Aerial chases are a feature of the courtship, and ace pairing has been established the males do not appear to hold rritories (Kendeigh 1941) though they continue to sing during nest-uilding and incubation. Both Kendeigh and Buttrick (1909) have esented evidence which suggests that the species is sometimes blygamous. The nest is built by the female and consists of a loosely ade cup of grasses and rootlets, which is usually placed in a shallow pression at the foot of a tuft or tussock of grass among dense vegeta-on, and is commonly held to be one of the most difficult to find. The utch of four to seven eggs is incubated by the female alone for a period 10-13 days. Both parents feed the young, which develop rapidly ad can leave the nest when only seven or eight days old, though they nnot fly at this stage (Bent 1958). A single brood is raised each ason.

The Bobolink's winter quarters are in the open grasslands of south-rn Brazil, Uruguay and northern Argentina and in its annual migra-ory cycle it travels over 12,000 miles, a movement surpassing that of ll other American passerines (Hamilton 1962). Autumn migration om the northern parts of its range begins in July and follows a com-lex and irregular path through the eastern and south-eastern United tates, and thence across the Caribbean or the Gulf of Mexico. As ready mentioned, migrants deposit a remarkable amount of fat (so uch so that the species is known as the Butter-bird when it passes rough Jamaica) and Odum *et al.* (1961) have shown that October igrants on the Gulf coast of Florida carry sufficient reserves to enable em to make a continuous flight of 80 hours or even longer. It is erefore scarcely surprising that the Bobolink can now be numbered mongst those American passerines which have successfully crossed ae Atlantic to appear in Europe.

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Special announcement

A survey of changes in status among British breeding birds

Although the birds breeding in the British Isles have probably been more studied and written about than those of any other country, there has been no general survey of their changes in numbers and distribution since that by W. B. Alexander and Dr. David Lack, published in this journal 21 years ago (*Brit. Birds*, 38: 42-45, 62-69 and 82-88). For some time we have been conscious that in this respect Britain has fallen sadly behind a number of other countries. Such a survey would not only have intrinsic scientific importance, but could provide a basis for future more detailed work on the populations of British birds and also for a more soundly based approach to the problems of their conservation. The very mass of material, published and unpublished, now available, however, made it difficult to find a qualified person with the necessary time for the thorough research involved. It is encouraging, therefore, that the Nature Conservancy has felt able to provide a two-year research grant to enable J. L. F. Parslow to tackle this task and that Dr. David Lack has agreed to supervise his work. Since September 1964, Mr. Parslow has been working at the Alexander

Library in Oxford on a study of the literature and we give below an account of his progress so far, together with an appeal for assistance, which is especially directed at those with unpublished information on this subject. It is intended to publish the full results of his investigations in *British Birds* during 1966.

* * * * * *

Alexander and Lack reviewed the many changes in status which had occurred among British breeding birds during the 100 years up to the time of the Second World War. Their survey followed an earlier one on the same subject by E. M. Nicholson (*Birds in England,* 1926). Many of the trends which were shown to have taken place have continued to the present day, as for example the marked decline in Britain of the Red-backed Shrike *Lanius collurio* (*Bird Study,* 9: 198-216) and the Wryneck *Jynx torquilla* (*Bird Study,* 10: 112-132). However, some trends, such as the former increases in southern England of the Grey Wagtail *Motacilla cinerea,* Redshank *Tringa totanus* and Snipe *Gallinago gallinago,* appear now to have been reversed. Yet other species for which there was little or no evidence of any change 20 years ago appear in more recent years to have increased or extended their range (e.g. Green Woodpecker *Picus viridis* northwards into Scotland, and Reed Warbler *Acrocephalus scirpaceus* westwards in Devon and into Cornwall) or to have decreased in certain parts of the country (e.g. Nightjar *Caprimulgus europaeus* and Wood Warbler *Phylloscopus sibilatrix*).

Apart from a few recent surveys in *British Birds* and *Bird Study,* which have dealt with individual species, the evidence for many of these changes is scattered through the ornithological literature, particularly in county and regional avifaunas and local annual reports. The main object of the present survey will be a review of this literature with the following aims in mind:

(a) to record the changes in status and distribution which have occurred during the present century among birds breeding in Great Britain and Ireland, concentrating particularly on those changes which have taken place since about 1940 (but excluding, so far as possible, those due to short-term effects, e.g. the severe winter of 1962/63),

(b) to relate these changes to those which have occurred in other parts of the species' range, and

(c) to discuss the possible reasons for any decline or increase noted.

Although the main source of material for the survey will be the ornithological literature, additional unpublished information will be used. Many useful data on recent changes have been incorporated in the returns from county editors and recorders to the distribution survey made in connection with the British Ornithologists' Union's

forthcoming review of the British avifauna, and this information has been particularly valuable in areas for which there is no recent regional publication. Further unpublished information on status changes among the breeding birds of even quite small areas, especially from those ornithologists having an intimate knowledge of the birds of one area extending over 20 years or more, would be welcomed by J. L. F. Parslow at the Edward Grey Institute, Botanic Garden, Oxford.

Notes

The status of immature Gannets off Cape Clear Island.—During the five and a half years from mid-August 1959 to December 1964, more than 300 different observers spent a total of over 1,630 hours sea-watching from Cape Clear Island, Co. Cork. The distribution of sea-watching throughout the year was uneven (with most in April, August and September), but observations were made in all periods except the second half of December.

In this time, a total of 320,286 Gannets *Sula bassana* was counted and 263,279 of these (82.2%) were separated as adults and immatures. With these large numbers, it would have been impracticable to attempt to age them more accurately and they were merely divided into those which were *fully* adult (with *no* trace of dark feathers in the secondaries) and those which still showed some sign of immature plumage. Some inconsistency is probably inevitable among so many observers, with distant near-adults being identified as adults by some

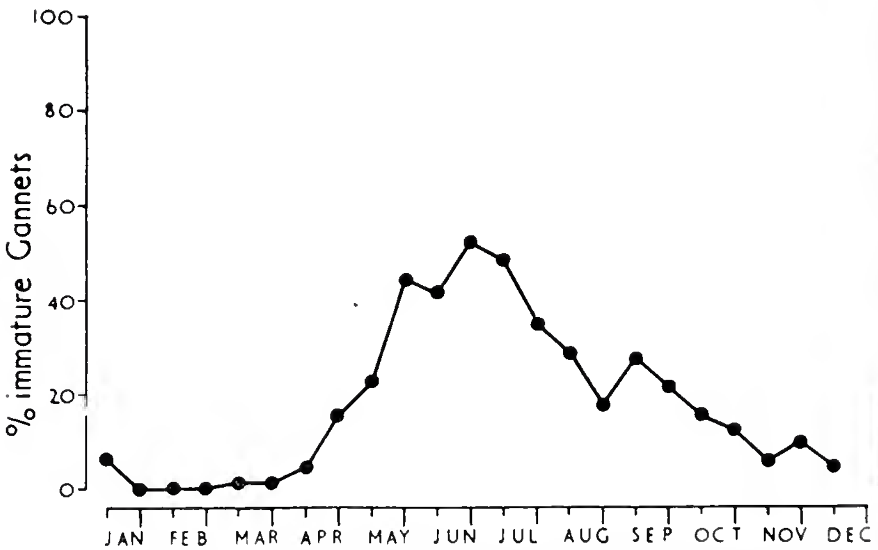

FIG. 1. Proportions of adult and immature Gannets *Sula bassana* off Cape Clear Island, Co. Cork, throughout the year (half-monthly periods; averages for 1959-64)

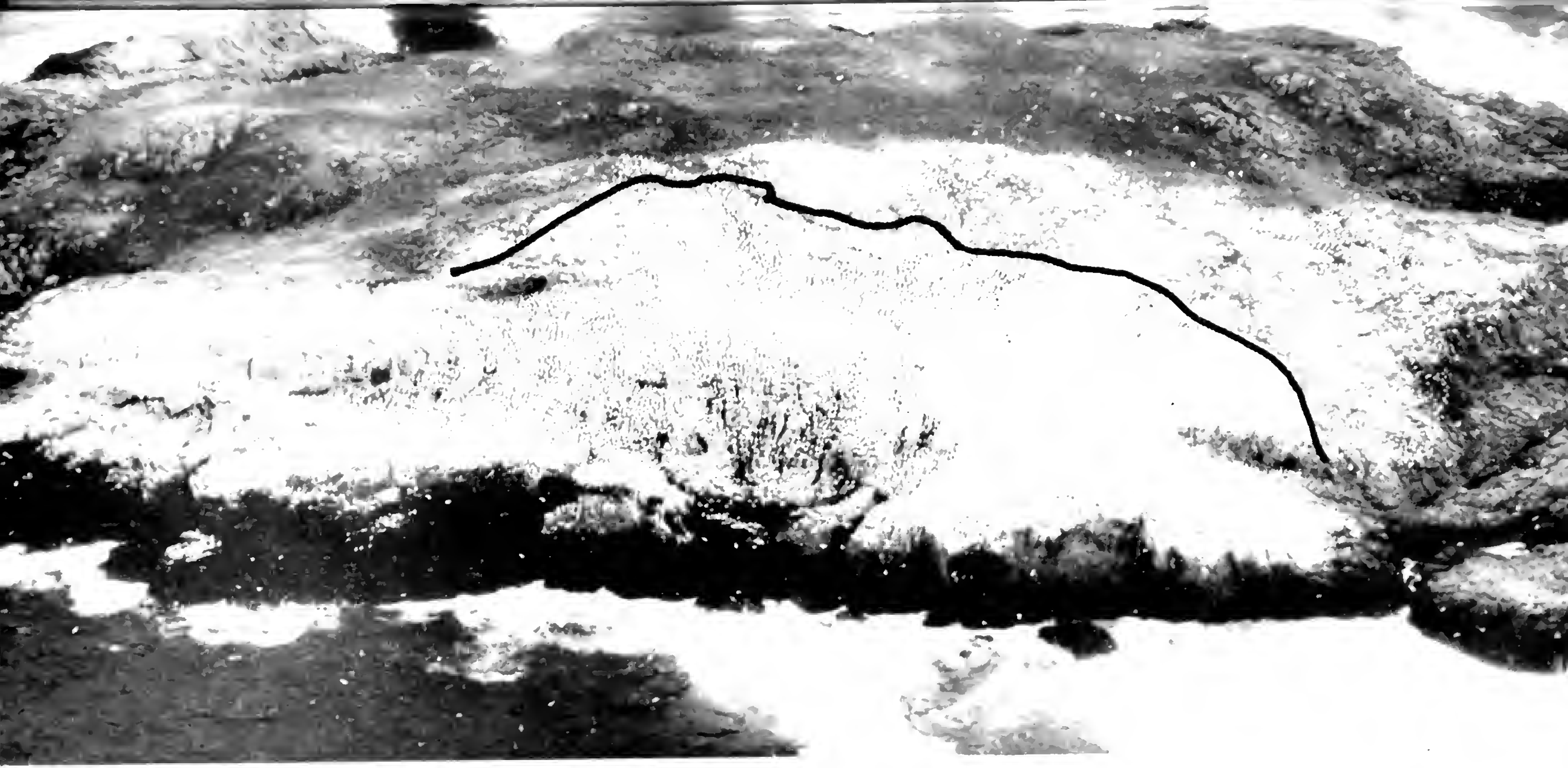

PLATE 53. North aerial view of the colony of Gannets *Sula bassana* on Grassholm, Pembrokeshire, mid-June 1964. The birds above and right of the black line are not on nests. Note the very regular spacing inside the colony. A count from an enlargement of this photograph showed about 15,500 nests in 1964, compared with some 6,000 twenty years ago and only 300 fifty years ago (pages 201-203) (*photo by courtesy of the Royal Navy*)

PLATE 34. East aerial view of the colony of Gannets *Sula bassana* on Grassholm, Pembrokeshire, mid-June 1964. Down from the picture's centre is the ridge which has formed the south-east boundary for thirty years: the birds have shown no sign of spreading over this since they reached [illegible] 1932–33 and all subsequent increases have been in the flatter areas farthest from the camera (page 202) (*photo by courtesy of the Royal [illegible]*)

PLATE 35. Black Vulture [illegible], Spain, April [illegible]. One of the largest and most powerful of the 14 Old World species. The massive bill copes with bones as well as flesh and entrails. The plumage is blackish brown, with a paler ruff. The bare parts of the head are dull blue, while the crown is covered with short brown down becoming whitish on the nape (pages 2[illegible]3, 2[illegible]5) [illegible]

PLATE 56. Black Vulture *Aegypius monachus* gliding in to land (actually at the nest on plate 38a), Spain, May 1964. The wing-span is about nine feet. Note the uniform dark plumage and well feathered legs above white feet

PLATE 57. Four Black Vultures and 24 Griffons *Gyps fulvus* at the carcase of a calf, Spain, April 1961. The larger and more powerful Blacks have deeper bills, heavier heads and bigger ruffs (*photos: P. van Groenendael*)

PLATE 38. Above, Black Vulture *Aegypius monachus* at nest in crown of 25-foot cork oak, Spain May 1964 (page 204) (*photo: P. van Groenendael*). Below, Black Vulture (right) at carcase with Griffon *Gyps fulvus* (centre) and Egyptian Vulture *Neophron percnopterus*, showing size differences (page 205) (*photo: Guy Mountfort*)

39A. Court-
splay of Wax-
Bombycilla
. Here the
is partly erect
e and tail to
le, while the
is turning her
for a 'gift'

39B. Display
by the male
tes the female
ond. The tail
essed and the
feathers are
into a hump
rises above
l of the back

39C. Display
y the one on
: feathers of
arkedly erect,
pivoted to-
he other bird
d turned away
ges 206-208)
F. M. Meadon)

PLATE 40. Bobolinks *Dolichonyx oryzivorus*, U.S.A. The male in summer (above) is unmistakeable with black head and under parts and large areas of white on rump, back and scapulars. But in autumn and winter he becomes more like the female (left): yellow-buff with dark stripes on crown and upperparts. The first recorded in Britain (pages 208-213) was considered to be a first winter male (*photos: Olin Sewall Pettingill, Jr.*)

and remaining unaged by the more cautious. On the other hand, first- and second-year Gannets can be confidently aged at considerable range, while fully adult ones at the same range must often remain unaged if the secondaries cannot be seen. The proportions of adults and immatures cannot be accepted as fully reliable, therefore, though the two sources of error probably balance and largely cancel each other out. In any case, they would concern only a very small proportion of the total and would not materially alter the picture.

The proportion of adults to immatures in each half-monthly period is shown graphically in fig. 1. The main westerly passage of Gannets off Cape Clear is between the beginning of March and the beginning of May (150 per hour) and from the end of July to the end of October (270 per hour). Immatures make up over 40% of the total only between the end of May and the beginning of July—the mid-summer period when movement is slack (60 per hour). They account for less than 10% of the total from the beginning of November to the beginning of April—the winter period when passage is at 30 per hour and part of the spring period when, as already stated, it is much heavier.

Ringing results (Thomson 1939, Dorst 1962) indicate that many first year Gannets winter on the west African coast, while the older ones stay mainly in European waters. The Cape Clear records suggest that those in their second to fourth winters (as well as first year ones) evacuate the south-west Irish coast in winter, but return to summer in the area. J. T. R. SHARROCK

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Common Sandpipers displaying on autumn passage.—Dr. Bruce Campbell's note on Curlews *Numenius arquata* displaying in autumn (*Brit. Birds*, 57: 33) prompts me to record comparable behaviour by two Common Sandpipers *Tringa hypoleucos* at Chard Reservoir, Somerset, in the late evening of 20th August 1964. These birds were feeding along the water's edge and gradually moving towards each other. When they were about 14 feet apart both suddenly began to call shrilly and excitedly. One, presumed to be a female, remained still as it called, but the other, from its behaviour no doubt a male, adopted an active role. It stretched its head and neck forward to the fullest extent, fanned its tail, held its wings loosely trailing below its body and gradually drew closer to the supposed female. The latter then adopted a crouching and submissive posture as though inviting coition. At this point, however, the whole performance ceased as suddenly as it had started and both resumed normal feeding. DAVID E. PAULL

Semi-palmated Sandpiper in Pembrokeshire.—On 20th July 1964, at about 13.00 GMT, A.W.D. saw a small grey wader with a Dunlin *Calidris alpina* on a drying-up pond on Skokholm, Pembrokeshire. It was between two-thirds and three-quarters the size of the Dunlin, and its scaly grey upper-parts, black legs, short black bill and hunched stint-like attitude gave the impression of a Little Stint *C. minuta*. It appeared very tired and reluctant to move, but finally flew off with the Dunlin when approached to within about 15 yards. In flight its pattern was similar to that of a Little Stint and it appeared considerably smaller than the Dunlin. Neither was seen again that day.

The next day, the smaller bird was found at the same place by W.J.P. and was then watched by both of us while we attempted to catch it in a Skokholm Dunlin Trap. During this period we observed that it lacked the 'V' on the back which is such a conspicuous feature of the Little Stint, and W.J.P. noted that its legs seemed unusually long. It was considerably tamer than it had been the previous day, allowing approach to within about 12 feet. When finally flushed, it flew with a fast, Dunlin-like flight, calling with a weak, hoarse *chirrup* and also (W.J.P.) giving a feeble, sharp *chip* audible only at close range.

It was eventually trapped in a clap-net at about 12.00 GMT. A thorough examination in the hand showed it to be a Semi-palmated Sandpiper *C. pusilla*. It was ringed, weighed, measured and fully described. It was also photographed and sketches were made of its bill and feet. When released, it appeared very weak and flew to another pond where it was watched bathing and preening. It was last seen at 15.00 GMT.

FIELD DESCRIPTION

General appearance: like a large Little Stint with relatively longer legs, a stouter bill and more streaked breast, and lacking the light 'V' on the back. Crown grey with light brown streaks, nape slightly paler. Whitish superciliary stripe. Ear-coverts light ash-grey. Chin and throat white. Under-parts clean white, except for a band of brown streaks across upper breast. Upper-parts grey with dark scaling, and some traces of dull chestnut in the scapulars. Head and neck appeared pale in sunlight, but the white half-collar mentioned in *The Handbook* was not noticeable. Tail light grey with dark centre. Bill stout and tapering, black, about same length as head. Legs longer than in Little Stint, appearing black at all ranges. *General habits:* when feeding, it would sometimes wade to the top of its tarsi, but it fed to a large extent on the muddy edges of the pond; it fed by probing and picking from mud and water, with side-to-side movements of the head rather like a *Tringa*. When alert, it stood erect with neck stretched up rather like a Ruff *Philomachus pugnax*. Its gait when feeding was noticeably slower and more leisurely than that of a Little Stint, but when disturbed it ran very quickly.

DETAILED DESCRIPTION

Upper-parts: forehead brown, feathers with light edges; crown sepia, mottled buff and light grey; nape lighter, with more buff edgings to feathers; ear-coverts ash-grey, lightly streaked white; lores as ear-coverts, with more white streaking; malar region sepia, feathers with buff edges; white of throat, with grey streaking, extending over

sides of neck to beneath ear-coverts; superciliary white; mantle mottled grey and dark sepia, some buff edges; scapulars dark sepia, some buff edges and some grey feathers, all edged white; rump warm sepia with pale edges; inner upper tail-coverts dark sepia glossed purple, outer white sparsely streaked brown. *Under-parts:* upper breast streaked ash-brown; flanks white, faintly streaked brown on hind flanks; rest of under-parts clean white. *Wings:* primaries dark brown; secondaries brown with white edges; primary coverts dark sepia, white edges to proximal feathers forming end of wing-bar; lesser, median and greater coverts grey-brown with dark centres, white tips to greater coverts forming wing-bar. *Tail:* pale ash-grey, central pair of feathers with dark sepia inner webs. *Bill:* black; short, stout, tapering, slightly swollen and flattened at the tip. *Iris:* black. *Legs:* very dark olive; feet webbed as far as first joint of toes. *Measurements:* wing 92 mm.; bill (to feathers): 18 mm.; tarsus 21.5 mm.; tail 35 mm.; weight 20.6 gms at 12.00 GMT. *Wing-formula:* 1st primary minute, 8 mm. less than longest primary covert; 2nd and 3rd longest; 4th 4 mm. shorter; 5th 10.5 mm. shorter; 6th 18 mm. shorter; 7th 24 mm. shorter.

The crown was in moderate moult and the whole plumage heavily abraded, particularly the lesser and median coverts. The bird was thus identified as an adult moulting into winter plumage. This record is the first for Wales and the third for Britain, excluding the one from the Hastings Area now rejected (see *Brit. Birds,* 55 : 358).

A. W. DIAMOND and W. J. PLUMB

Gulls preying on adult Storm Petrels.—In his paper on 'The Breeding of the Storm Petrel' (*Brit. Birds.* 50 : 85-101, 371-384), Peter Davis concluded that Great Black-backed Gulls *Larus marinus* take a small toll of fledgling Storm Petrels *Hydrobates pelagicus,* but he did not refer to their preying on adult petrels and I have been unable to find any mention of this in the literature. The following observations may therefore be of interest.

On 23rd August 1964, B. Hughes visited Burhou, a small island off Alderney in the Channel Islands, and, among a number of gull pellets, he found about a dozen large and untidy ones which consisted exclusively of the remains of Storm Petrels. Still more interesting, they also contained three rings which proved to have been used on adult petrels, two in July 1962 and one in July 1963 (over 2,500 Storm Petrels have been ringed at a large colony on Burhou during the past five years). These pellets all retained the characteristic petrel smell despite having been in the gulls' digestive tracts and, in some cases, having lain exposed to the weather for a time. Most of them seemed to include the remains of more than one petrel.

Burhou, like other islets and reefs around Alderney, supports large populations of Herring Gulls *L. argentatus*—the most numerous—and Lesser Black-backed Gulls *L. fuscus,* as well as smaller numbers of Great Black-backed. The last have increased significantly during the last decade and the auk colonies in the Channel Islands have suffered accordingly, but there is no evidence as yet of any effect on the Storm

Petrels there. Nevertheless, although the other species cannot be excluded, it seems probable that the pellets were those of Great Black-backed Gulls. R. LONG

A brown-and-white Magpie in Hampshire.—An abnormal Magpie *Pica pica* was shot at Durley, Hampshire, on 4th January 1965 and I was given an opportunity of examining it before it was sent to the British Museum (Natural History). The only colours in its plumage were brown and white, without any gloss. All the parts which are black in a normal Magpie were brown, varying from chocolate brown on the head, neck and under the tail to coffee-coloured elsewhere.

H. E. Forrest (*Brit. Birds,* 15: 41) described two abnormal Magpies obtained in Shropshire in 1921. One of these was grey on the crown, dull fawn on the neck, breast, rump and legs where black is normal, and otherwise nearly white. The other had pale grey in place of the usual black, and pale grey primaries without any white. Both these Magpies had hair-like primaries and rectrices owing to a defect in their structure. The two centre tail-feathers of the Hampshire one were similarly deformed.

C. J. O. Harrison (*Bird Study,* 10: 219-233) listed 13 families, including the Corvidae, in which grey and fawn variant plumages had been recorded, but he did not mention the Magpie. He also showed how loss of pigment might cause the feathers to degenerate. C. SUFFERN

[C. J. O. Harrison has commented as follows: 'The body of the brown-and-white Magpie described by Dr. Suffern is now preserved in the British Museum (Natural History) and I have been able to examine it. All the normally black plumage has been replaced by brown, or it would perhaps be more correct to say that only brown is present. Although rather darker than the non-eumelanic schizochroic forms of other species, and so not an obvious 'fawn' variant, I think it is probably one of these. It is completely lacking in gloss, but, since the feathers that would normally show this have been subject to the extreme fading and wear which occurs in schizochroic specimens, this may not have been so in fresh plumage. The bill, legs and feet are coffee-brown.

'There are three variant skins of the Chinese race of the Magpie *P. p. sericea* in the British Museum, two of them appearing dark brown and one pale grey, but on close inspection these seem to have both melanins present and I suspect that they represent different degrees of dilution.'—EDS.]

Wakefulness of Blue Tit roosting in street lamp.—At 7 p.m. on 2nd January 1965, a fine and very dark night with the temperature below zero, I was walking near my house at Virginia Water, Surrey, when a

shadow appeared on the road in the area of light thrown out by a street lamp. I expected to see an owl, but on looking up was surprised to find a small bird hopping about in some brambles underneath the lamp. I stood still and it flew straight to the lamp and without hesitation disappeared between the bulb and the glass shade. I walked over to the lamp and, looking up at the light, saw a Blue Tit *Parus caeruleus* sitting on the upper edge of the glass shade under the metal reflector. It immediately flew out again and went back to the brambles, but as soon as I left it returned to the lamp.

What surprised me most was that, even assuming it had previously been disturbed, the bird should have flown out of the shadows straight up to and past a brilliant light nearly three hours after dark.

DOUGLAS CARR

[The roosting of Blue Tits in street lamps is well known in London (see *The Birds of the London Area since 1900*: 238) and is regular in Salisbury, Wiltshire, and other places (*Brit. Birds,* 54: 287-288), but in this case the activity long after dark seems unusual.—EDS.]

Rufous Warbler in Lincolnshire.—On 2nd September 1963, at the north end of Butlin's Holiday Camp, near Skegness, Lincolnshire, I noticed a brownish bird with a red tail perched on a fence about 50 yards away. It flew down to the ground, displaying a broad, fan-shaped, chestnut-red tail tipped with white spots. Through a telescope I could see that its upper-parts were a warm sandy-brown and its under-parts pale buff, and that it had a pale superciliary stripe. It frequently jerked its tail up and down and sometimes erected it vertically. I identified the bird as a Rufous Warbler *Agrobates galactotes*. After a while it flew off to a small sewage-farm behind the fence, where I could not follow it.

The following morning I found the bird again and was able to watch it from a distance of about ten yards. I could now see that its legs were long and greyish-flesh in colour; in flight a black subterminal bar showed clearly on the tail-feathers. I went to Gibraltar Point Observatory and fetched R. B. Wilkinson, C. Devlin, E. T. Lamb and A. Sykes, who then watched it with me. Attempts to catch it were unsuccessful, but the next day, 4th September, it was trapped and ringed by R. B. W. The following is a summary of the detailed description which was taken:

> Plumage generally very abraded and body feathers falling out; no sign of new plumage on either body or wings; feathers round vent very wet with excrement adhering to them. *Upper-parts*: dark brown stripe through eye, with whitish-buff superciliary extending from base of bill to well behind eye; crown and mantle warm ginger-buff; rump more rufous than mantle but not as bright as tail; secondary, median and lesser coverts as mantle but with pale edges; primary

coverts and bastard wing much darker and more contrasted with rufous edges to outer webs. *Tail:* feathers very abraded at tips; generally bright rufous and central pair entirely so; second pair from centre each had small black spot near tip; third pair each had black subterminal bar with rufous tip; fourth, fifth and outer pairs had broad black subterminal bars tipped to a progressively greater extent with white; upper side of tail showed no markings when closed, while under side dull rufous with white tip and black subterminal bar. *Underparts:* upper breast and throat buff; belly and under tail-coverts white. *Soft parts:* eye nigger brown; bill quite stout with upper mandible slightly decurved at tip; upper mandible horn brown, lower mandible whitish at base and horn brown at tip; legs greyish-flesh, claws horn-coloured. *Measurements:* wing 88 mm., bill 18 mm., tarsus 31.8 mm., tail 72 mm.

It was decided that the bird was an adult male of the western form *A. g. galactotes*. After being photographed by Miss F. E. Crackle, A.S. and myself, it was released and flew strongly away to its usual feeding ground. I watched the bird on each of the next two days and, though I then left the area, R.B.W. and others recorded it up to and including the 9th. It was seen to tug at the base of a tuft of grass and to wipe its bill after feeding in the manner of a Song Thrush *Turdus philomelos*. It was once pursued by a Chiffchaff *Phylloscopus collybita* which had been mobbing it on a fence, but no other birds were seen to attack it. I never saw it perch on a bush or tree, but it once hovered above some docks and thistles.

With the exclusion of the Hastings Rarities (see *Brit. Birds,* 55: 366), this is the eighth record for the British Isles, and it is the first for Lincolnshire and the east coast as a whole. F. J. LAMBERT

[R. B. Wilkinson has asked us to express the gratitude of Gibraltar Point Bird Observatory to the staff of Butlin's Holiday Camp for giving many bird-watchers access to parts of the camp normally denied to the general public.—EDS.]

A highly conditioned Grey Wagtail.—The attacking of its own reflection by a bird is a commonplace. The extension of this habit into a conditioned reflex seems worth recording, even though the observation is only a casual one.

On 21st January 1965 my wife and I visited Lulworth Cove, Dorset. Ours was the only car there and we parked at the seaward end of the road. Almost at once an adult Grey Wagtail *Motacilla cinerea*, assumed to be a male, appeared on the right-hand front wing of the car and began attacking the mirror. Again and again he flew against it and momentarily alighted on its rim. From time to time he dropped for a few seconds into a roadside ditch, but he continued his attacks throughout the 10-15 minutes we stayed there. In discussion afterwards we agreed that he could not have seen his reflection from anywhere on the ground and probably not until he had alighted on the car.

On 23rd January, when we arrived at the cove, another car was parked where we had been two days earlier and the wagtail was attacking that mirror. However, when we parked 30 yards behind the first car he immediately flew to us and began an attack which lasted as long as we stayed there. This time he could not possibly have been actuated by his own reflection, for he approached the mirror from its back. Evidently he was conditioned to regard a car with a wing mirror as embodying another wagtail; but it is difficult to imagine why he should have left the car with which he was already occupied for another. The incident is the more noteworthy since almost certainly he saw the arrival of our car in the mirror he was attacking.

So obsessed was this wagtail in his attacks that when two days later we visited the spot again and he performed as usual, he did not desist when I leant against the actual wing. Finally I laid my forefinger along the upper edge of the mirror. This gave him pause to the extent that several times when within an inch or two of the mirror he fell back. Very soon, however, he became so far habituated to the finger that he repeatedly perched on it. When we backed for some fifty yards to a turning place he kept close to the mirror all the way.

R. E. MOREAU

Bullfinches feeding on honesty pennies.—There was a heavy seeding of honesty *Lunaria annua* in my garden at Woodstock, Oxfordshire, in the autumn of 1963 and between 6th November and the end of January 1964 I continually surprised from one to six Bullfinches *Pyrrhula pyrrhula* on the clumps of dead stalks with their conspicuous 'pennies' or 'moons'. On 29th November I saw a male fly up holding one in his bill and flit about the branches of a bush with it. Examination of the clumps suggested that the birds also extracted seeds from the pennies *in situ*, pecking at the middles, so that the ground below became covered with white flakes. After supplies in the garden were more or less exhausted, the Bullfinches entered our small courtyard and attacked a clump of stalks there. There was only a small seed-crop in 1964, but they continued to visit the courtyard in the winter of 1964/65.

Miss H. Stocks tells me that Bullfinches also attacked honesty pennies in her garden at Hauxton, near Cambridge, in the winter of 1963/64, something she had not known them do before. They 'sometimes perched on the plants, extracting and eating the seeds thereon, and also pulled off individual pennies, laying them on the ground and eating the seeds there. During the autumn and winter of 1964 there were fewer honesty stalks and the Bullfinches were busy on them, although perhaps not to such an extent as in 1963/64.' Miss Stocks adds that for many years her Bullfinches have fed on seeds of forget-me-not *Myosotis*, and this happens regularly in my garden too; she says that

they also take the seeds of evening primrose *Oenothera*.

Finally, Miss R. M. Phillips informs me that Bullfinches started attacking honesty seeds in her garden at Stonesfield, Oxfordshire, during the winter of 1964/65 after there had been a heavy crop in the autumn.

BRUCE CAMPBELL

[Ian Newton, of the Edward Grey Institute at Oxford, who has been making a study of the food of Bullfinches, tells us that he has not himself seen Bullfinches eating *Lunaria*, but he believes that there are scattered references to it in the literature. Forget-me-not seeds formed about 3% of the diet he recorded in the Oxford area and he has noted the taking of evening primrose seeds once or twice.—EDS.]

Review

Europe: A Natural History. By Kai Curry-Lindahl. Hamish Hamilton, London, 1965. 299 pages; 264 photographs (108 in colour). £4 14s. 6d.

Recent trends have made possible books of a new type, more comprehensive and synoptic in content and more sumptuously designed, produced and illustrated than anything seen much before the present decade. These trends include the far more extensive and intensive investigations of natural history at home and abroad; the renewed interest in this field as a whole rather than in subjects like ornithology in isolation; the keener awareness of ecological patterns and of conservation problems; the growth of internationalism and of travel farther afield; and not least the capability of making and reproducing both monochrome and colour pictures of remarkable quality and impact.

So we have the paradox that in an age of increasing specialism we are witnessing the appearance of a school of outstanding generalists with the skill to marshal and to present coherently and readably a mass of information gathered from innumerable specialist sources. Kai Curry-Lindahl's *Europe* is an excellent example of the great merits and inevitable limits of this new type of book. Visually it carries one from end to end of Europe through a generous range of well-chosen pictures most admirably reproduced by Conzett and Huber of Zürich, where they know how to get the colours clear and right. Textually it presents a very readable and well-informed account of the major landscapes and ecosystems of Europe and its most exciting regions from the standpoint of the naturalist.

Here, however, a word of criticism is necessary. In some of the chapters, of which that on the British Isles is unfortunately one, there is a superficiality and a sacrifice of treatment in depth to journalistic

values, which is unworthy of the work as a whole and of its better chapters such as that on the Coto Doñana. This appears to be partly due to sources of varying quality and thoroughness, partly to inevitable unevennesses in the author's personal interest and knowledge, and partly perhaps to the editing into English which the text has undergone. Whatever the reason, the standard is far from uniform, and at times exhibits serious carelessness, as when we are told that 'nowadays Scotland is almost devoid of trees' or that Mount Elbrus is 14,481 feet and is 2,600 feet higher than Mont Blanc (which is elsewhere correctly credited with 15,781 feet). There is an even bigger mathematical error over the area of Europe's Atlantic and Arctic islands relative to that of Britain. It is curious also to find the Red Grouse of Scotland invariably and without explanation termed the Willow Grouse.

On the whole, however, the author has succeeded in presenting a huge range of information on natural history and geography for region after region of Europe with a modern and balanced ecological outlook and insight, and an attractive power of stimulating and enlightening the reader. Needless to say, Mr. Curry-Lindahl's ornithological facts are accurate and he succeeds among many other things in conveying the setting in which the bird-life of Europe exists perhaps more successfully than ever before. The sketch-maps are perhaps too sketchy in their content, as are the coloured end-paper vegetation maps. However, such faults as the work has are far outshone by its great merits and its immense interest and charm. E. M. NICHOLSON

Letters

The original misidentification of the Hampshire Cetti's Warbler

Sirs,—Details were published last year of the Cetti's Warbler *Cettia cetti* at Titchfield Haven, Hampshire, from 4th March to 10th April 1961 (*Brit. Birds,* 57: 365-366). We consider it regrettable, however, that a full picture was not given of the events leading up to its identification, since these offer a striking example of what might almost be termed the mass hallucinations which occasionally afflict groups of field ornithologists. The best known of these—and, in fact, the only one, we believe, which has been fully described in print (at least in Britain)—is the case of what came to be known as the Berkhamsted grey shrike. This bird was present at Berkhamsted, Hertfordshire, from 6th March to about mid-April 1940 and then again in the winters of 1940/41 and 1941/42. During this time it was seen by many observers, some of them very experienced, and identified and described as a Lesser Grey Shrike *Lanius minor*; in fact, it appeared as such both in this journal (*Brit. Birds,* 34: 17 and 178) and in the 'Additions and Corrections' to

The Handbook. It was only on 12th February 1942, when it was seen by the late B. W. Tucker and H. G. and W. B. Alexander, that it was correctly identified as a slightly aberrant Great Grey Shrike *L. excubitor* (for full details see *Brit. Birds,* 36: 51-53).

This misidentification, which lasted for so long and was so authoritatively supported, has always been regarded as providing a useful warning to field ornithologists. It did, however, relate to a bird which, by certain departures from the normal, including its lack of a white superciliary stripe and its apparently small size, might be said to have offered some excuse for such a mistake, though, of course, not for the general acceptance of this. It is all the more important, therefore, for observers and those engaged in bird-recording to know of the original misidentification of the Cetti's Warbler at Titchfield Haven since this perfectly normal individual was for some ten days taken to be a Moustached Warbler *Lusciniola melanopogon,* a species altogether different in appearance.

The facts are as follows. This bird was first heard singing on 4th March but was not seen properly until the 7th. It was then identified as a Moustached Warbler and this identification was maintained without serious question until the 16th. During these eight days the bird was seen and heard almost daily by a number of observers, some of great experience, and continued to be identified as a Moustached Warbler. Descriptions were recorded which 'confirmed' this identification and which included such items as 'streaked' back and 'blackish' or 'dark' crown, though in actual fact these characters were not present. So 'good' were these 'descriptions' that if the bird had left by 15th March it would have stood a chance of being accepted as a Moustached Warbler. We understand that one observer did, during this first period, suggest that it might be a Cetti's Warbler, but that he did not persist in the face of general opposition.

On 16th March we visited the area, fully expecting to see a Moustached Warbler. Our very first glimpses showed us that something was wrong since we saw it near a Dunnock *Prunella modularis* (as we understood others had done on various previous occasions) and it was quite obvious that the two birds were of approximately the same size! At that time R.H.C. knew Moustached Warbler but not Cetti's and, as soon as he got a good view of the bird, he was able to say without hesitation that it was not the former. D.D.H. at the time did not know Moustached Warbler but was familiar with Cetti's. He was thus able to identify it as the latter, as was R.H.C. later when he had been able to consult books. We informed local observers, a number of whom were present and one of whom had kindly found the bird for us, but they were unwilling to accept our views. Indeed, when D.D.H. revisited the area on 18th March local observers were still

clinging to the belief that it was a Moustached Warbler, though others who saw it that day thought differently. Fortunately its capture on the following day put the matter beyond doubt.

The above facts are already known to a good many ornithologists and we do not think it right that they should have been totally suppressed in the published account. We claim no special credit for having been the first to correct the blunder which had been made. Any competent and experienced field ornithologist should have done the same and, in fact, one such observer did so independently on 18th March. Nor do we in any way wish to impugn the honesty of those who made and persisted in the original incorrect identification. We are quite convinced that they genuinely believed that they were looking at a Moustached Warbler and that they thought they were seeing the details which they were taking down in their 'field notes'. But this very fact, in our view, makes it important that the circumstances of this false identification should not be suppressed. For here was a bird which could be seen quite well, if usually only briefly, and was so seen (and heard) by *many* observers for more than a week without anyone becoming aware that it was being not only wrongly identified but *wrongly described*. It is of particular interest to note the way in which such a collective deception can be maintained. When we were looking at the bird we were asked, 'Can you see the dark crown?' or 'Can you see the streaked back?', and we found it required a considerable effort of will, as well as some confidence in one's own powers of observation, to reply that one could *not* see these features and that, in fact, they were not present. The whole episode serves as a warning that even the presence of many observers over a considerable period and the availability of 'perfect' descriptions from them may be no guarantee of the correctness of an identification.

R. H. CHARLWOOD and D. D. HARBER

The Sussex Cetti's Warbler and the value of fault-bars as a means of ageing birds

Sirs,—The record of a Cetti's Warbler *Cettia cetti* in Sussex published by you last year (*Brit. Birds,* 57 : 366 and plate 57b) does not mention that it was almost certainly a juvenile. This is apparent from the photograph of its tail where the 'fault-bars' (or starvation marks) form bands round from feather to feather, indicating that these were grown simultaneously. An adult would have replaced its feathers in pairs and any bars present would appear out of phase from feather to feather.

The nature of these marks on feathers was first discussed by Dr. Oscar Riddle (1908, *Biol. Bull.,* 14 : 328-370) who concluded that the bars occur in that section of the feather which grows during the later part of the night. More recently, H. and J. R. Michenor (1938,

Condor, 40 : 149-160) demonstrated that the bars on individual feathers can be related to the daily growth of the latter. They also showed (p. 150) that the bars are already present on the feathers before they emerge from their sheaths; thus they are produced during the growth of the feathers and not subsequently. W. E. Glegg (1944, *Ibis,* 86 : 511-516) found some sort of fault-barring on each of 935 specimens (of hundreds of species on the British List) which he examined; he specifically noted barring on the tails of 737 of these.

It is essential that this character should be used carefully, however, since the bars which occur on feathers grown after the moult may *appear* to form bands, although in this case bars in the same position on adjacent feathers do not refer to the same day's growth. Such bars may be distinguished from those on feathers grown in the nest because the latter usually show marked unevenness in width, spacing or colour which can be traced from feather to feather. The bars on feathers grown on fledged birds are normally more regular: any discontinuity will not appear in the same position on neighbouring feathers. The Michenors pointed out that replacement feathers on a full-grown bird which has lost all or part of its tail will, since they have all grown at the same time, show the same sort of pattern as juvenile feathers. Catastrophic loss of this nature can also affect other characters used for ageing, but it is uncommon and does not invalidate this method.

Although the use of these bands for ageing may not yet be universally accepted, I am sure that it is valid for all species which do not moult their tail-feathers simultaneously. It is also very useful since, for many species, it provides a means of distinguishing apparently adult birds in their first breeding season from older individuals. Ringers who may like to try this technique will find the Blue Tit *Parus caeruleus* a good bird on which to start. In this species the juvenile tail-feathers (with the occasional exception of the central pair) are retained until the end of the first breeding season; the age may easily be checked by reference to the primary coverts which are blue in true adults and tinged green in first-year birds. C. J. MEAD

A suggested form for use with unusual records

Sirs,—With the support of the *British Birds* Rarities Committee, I should like to draw the attention of local and county recorders, and of observers who submit records, to my idea of cyclostyled 'Unusual Record' sheets. These have been successfully used in Northumberland and Co. Durham since 1962, not only for rarities but also for common birds out of season. I feel that a more widespread acceptance of such a system might help to ease the tasks of observers in submitting their more unusual observations and of records committees in assessing them, and generally make things more efficient.

The headings down the margin of the first side of the foolscap sheet are (with appropriate spacing):

Species:
Date and time:
Place:
Distance:
Period of observation:
Weather and light:
Optical aids used:
Species present for comparison
(*a*) *alongside the bird:*
(*b*) *near-by:*
Observer(s) who claim the record:
Any who disagree:
Experience of the species:
Experience of similar species
(*a*) *same day:*
(*b*) *previously:*

The second side is headed:

Full account, with description and sketches, preferably before reference to books. (If not written on the spot, please add any notes that were.)

while near the bottom is the question:

Is this record 100% certain?

and the comment:

Please add extra sheets if desired.

It will be noted that these headings and questions still allow the observer to describe (on side 2) his encounter with the bird in his own way. I would deplore such headings as *Beak*, *Tail* and *Flight* as these only prompt the observer to enter details which he may not consciously have noted. What he did notice about the bird he will mention of his own accord, and it is much more illuminating to have such details described in his own words, in his own order of preference and with his own emphasis.

The question '*Is this record 100% certain?*' may seem arbitrary, but it does indicate the observer's confidence in his own record—a useful consideration. It is important that this question comes at the end of the sheet, as it is after, not before, writing his account that he should decide the answer.

The other questions (on side 1) ensure that all the necessary supporting details are supplied. My own experience has shown that a letter often omits (usually inadvertently) some important detail, resulting in delays and extra correspondence. Phrasing tactful questions in a letter to a sensitive observer can, in addition, be very arduous! The 'Unusual Record' sheets minimise the risk of such omissions and so enable a fairer and quicker assessment to be made. They are also much easier than letters to file away.

I should add that D. D. Harber, Hon. Secretary of the Rarities Committee, has copies of the form available for anybody who might like them.

D. G. Bell

White-throated Sparrows in Hampshire

Sirs,—Following up the letter by Roy H. Dennis (*Brit. Birds,* 56: 114), I visited the East Park Aviary, Southampton, in April 1963. There was one White-throated Sparrow *Zonotrichia albicollis* there and A. Moody, the aviary attendant, informed me that this was the only one remaining of four which had arrived on one of the Cunard ships in October or November 1958 (the other three having died in the aviary). Mr. Moody now informs me that this last one also died in the aviary in January 1964.

Even though this was clearly a case of 'assisted passage' right across the Atlantic, the arrival together in Southampton of no less than *four* White-throated Sparrows seems in itself worth recording. At the same time, the fact that all four died in captivity shows that the bird I saw at Needs Oar Point, Hampshire, in May 1961 (*Brit. Birds,* 54: 366-367) cannot have been one of them; it remains far more likely that that was the same as the one seen shortly before by A. L. Durand on board R.M.S. *Queen Elizabeth* (*Brit. Birds,* 54: 439-440).

J. T. R. Sharrock

News and comment

Edited by Raymond Cordero

Malin Head Bird Observatory.—The chain of British and Irish observatories was strengthened at the Bird Observatories Conference in Oxford last January with the official recognition of Malin Head, Co. Donegal. This headland, so well known from the shipping weather forecasts, is the most northerly point of Ireland. A recently published report by T. R. E. Devlin and O. J. Merne, covering observations there during the autumns of 1961-64, contains a systematic list and sea-watch tables, as well as an outline of the general nature of the area and information for prospective visitors (there is accommodation for up to six people). On the basis of these observations Malin Head is well placed for the study of sea-bird movements, of immigration into the British Isles from the north-west and of birds entering Ireland from western Scotland. Rarities have not been numerous in this period, but they have included Black-browed/Yellow-nosed Albatross, Madeiran Little Shearwater (see *Brit. Birds,* 58: 189-190), Balearic Shearwater, Sabine's Gull, Red-breasted Flycatcher and Yellow-browed Warbler. The report costs 2s. 6d. and is available from the Hon. Secretary, O. J. Merne, The National Bank Ltd., Ballaghaderreen, Co. Roscommon, Ireland.

Enterprise Neptune.—On St. George's Day, 23rd April, the National Trust launched Enterprise Neptune, its campaign for the preservation of the British coastline. On many of the hills from which flared the beacons warning of the Armada's approach, bonfires were lit again to warn that miles of our matchless coast are in growing danger of spoilation. The Trust aims to protect, by acquisition or covenant, the finest unspoilt coastlands which remain—some 900 miles in all. Among the organisations from which it has secured agreement, co-operation and, where appropriate, support, are the Nature Conservancy, the Council for Nature and the Royal Society for the Protection of Birds. Wherever it has the right to do

so, the National Trust will give public access to such lands as may come under its control. It will provide facilities for enjoyment, recreation and scientific study to the extent that these are compatible with the needs of agriculture, forestry and the preservation of the countryside and its plant and animal life.

R.S.P.B. Gold Medal for C. A. Norris.—At the 75th anniversary dinner of the Royal Society for the Protection of Birds, held in London on 30th March, the president, Lord Hurcomb, presented the Society's Gold Medal to C. A. Norris for his services to bird protection. Mr. Norris was on the Society's Council for six years, including three as chairman of its Finance and General Purposes Committee at a time of rapid expansion and the moving of the headquarters to Bedfordshire; he is also a former president of the British Trust for Ornithology.

National Nature Week, 1966.—The Council for Nature's second National Nature Week will be held from 23rd to 30th April 1966. Over 130 organisations, including government and other national bodies and many specialist natural history societies, have promised support. Among events planned is a Wild Life Exhibition at Alexandra Palace, sponsored by *The Observer Magazine,* the theme of which will be 'Living with Nature'. There will also be special exhibitions, lectures, film shows and guided nature walks all over the country.

Recent Reports

By I. J. Ferguson-Lees

(These are largely unchecked reports, not authenticated records)

This summary gives the general picture from mid-March to mid-May, thus following the one published in April (*Brit. Birds,* 58: 159-160). The rarities will be dealt with in the next issue and we hope then to produce an analysis of summer visitors though the information is still coming in.

Mid-March produced the first **Wheatears** *Oenanthe oenanthe,* **Garganey** *Anas querquedula* and **Swallows** *Hirundo rustica.* Then on the 19th-20th there came a widespread but rather small fall of **Wheatears** and **Chiffchaffs** *Phylloscopus collybita,* followed by bigger numbers of these and the other early species up to the 25th, during the 28th-30th and again during 2nd-4th April. This period also saw a scattering of **Black Redstarts** *Phoenicurus ochruros,* **Firecrests** *Regulus ignicapillus* and **Bluethroats** *Cyanosylvia svecica* and a large influx of **Hoopoes** *Upupa epops.*

Hoopoes appeared from 20th March into May, with the great majority between 28th March and 4th April. No less than 40 were recorded then in Ireland, 21 of them in Cork and 14 more in the other south coast counties of Kerry, Waterford and Wexford, the remaining five in Tipperary and up the west side in Galway, Mayo and Donegal. At the same time, six to ten or more were seen in nearly every south coast county of England. On 29th March there were seven in one flock, and nine altogether, on St. Agnes (Isles of Scilly) and five near St. David's (Pembrokeshire). A few were scattered in other parts of England and Wales north to Anglesey.

The rest of April was disappointing. The weather was generally cold and freak snow and rain in north-west Africa caused mortality and reversed migration in Morocco and Tunisia. Warblers, particularly **Whitethroats** *Sylvia communis,* were still dismally scarce by the end of the month, as were **Swallows, House Martins** *Delichon urbica* and the species which arrive in the second half of April, such as **Turtle Doves** *Streptopelia turtur,* **Cuckoos** *Cuculus canorus* and **Swifts** *Apus apus.*

Then, suddenly, the first three days of May changed everything. There were big falls of long-delayed migrants, especially **Whitethroats, Reed Warblers** *Acrocephalus scirpaceus,* **Sedge Warblers** *A. Schoenobaenus,* **Garden Warblers** *Sylvia borin,*

Grasshopper Warblers *Locustella naevia*, **Redstarts** *Phoenicurus phoenicurus*, **Swifts, Turtle Doves** and so on. Some of these were doubtless on their way to Scandinavia because the same movement included **Wrynecks** *Jynx torquilla*, such northern waders as **Spotted Redshanks** *Tringa erythropus*, **Wood Sandpipers** *T. glareola* and **Ruffs** *Philomachus pugnax*, a few **Temminck's Stints** *Calidris temminckii* and **Little Stints** *C. minuta*, and such rarities as **Rustic Bunting** *Emberiza rustica* and **Red-throated Pipit** *Anthus cervinus*. Birds of prey were also on the move—**Marsh Harriers** *Circus aeruginosus*, **Montagu's Harriers** *C. pygargus*, **Honey Buzzards** *Pernis apivorus*, **Peregrines** *Falco peregrinus*, **Kestrels** *F. tinnunculus*, **Long-eared Owls** *Asio otus*, and **Ospreys** *Pandion haliaëtus* in eight or ten counties.

Terns and skuas, the latter including several **Pomarine Skuas** *Stercorarius pomarinus*, were another feature of this period. **Common Terns** *Sterna hirundo* and **Sandwich Terns** *S. sandvicensis* passed along the south coast in large numbers which were reflected on the east coast and inland. On 1st May a heavy eastward passage of **Black Terns** *Chlidonias niger* was widely reported on the south coast from Dorset to Kent, the most being 203 at Gilkicker (Hampshire) and 342 and 470 at Selsey Bill and Chichester (Sussex). Further east, at Beachy Head (Sussex), for example, there were fewer and, though 70 were seen at Dungeness (Kent), it seems likely that many turned inland. On the 2nd over 100 went east along the north coast of Norfolk and during the 1st-3rd a few groups of up to 50 and many smaller parties were seen inland in the area bounded by Yorkshire, Lancashire, Somerset and Middlesex. **Gull-billed Terns** *Gelochelidon nilotica* appeared at Dungeness (two) and Sandwich Bay (Kent) on 1st May.

Finally, the middle of May, particularly the 11th to the 14th, was another period of big movement with more Scandinavian migrants, more birds of prey including a number of **Hobbies** *Falco subbuteo*, more **Ruffs, Spotted Redshanks** and other northern waders, and the first real arrival of **Spotted Flycatchers** *Muscicapa striata* and **Nightjars** *Caprimulgus europaeus*. There was also another peak of **Black Terns** in the same general areas as before, but without any large coastal passage and including flocks of 30 as far west and north as Glamorgan and Lancashire and 62 at Spurn (Yorkshire), as well as two **White-winged Black Terns** *C. hybrida* in Northamptonshire. Southern rarities, among them a **Red-rumped Swallow** *Hirundo daurica* at Spurn and male **Serins** *Serinus canarius* in Somerset, Sussex and Cambridge, were a marked feature of this time, but they will be dealt with in the next issue.

Requests for information

Colour-ringed terns.—A number of young terns *Sterna spp.* were colour-ringed on the east coast of Britain in 1964 and the resulting sight records included several in Wales. A more extensive marking programme is being undertaken this year (and probably for several years to come) with a view to recording movements and changes in colonies of Sandwich Terns *S. sandvicensis*, Arctic Terns *S. macrura*, Common Terns *S. hirundo* and Roseate Terns *S. dougallii*. Sight records of colour-ringed terns of any of these species, including the number of individuals, the positions of both colour and metal rings on the legs, and the date and locality, will be gratefully received by **N. P. Langham, Department of Zoology, Durham University, Durham City.**

Separating chicks of Common and Arctic Terns.—A. D. Brewer is collecting data on the tarsus lengths of chicks of Common Terns *Sterna hirundo* and Arctic Terns *S. macrura* with a view to ascertaining whether these measurements provide a reliable means of separating the two. Will anyone likely to visit unmixed colonies of one or other species this summer, either in Britain or abroad, contact **A. D. Brewer, 40 Sherbrooke Avenue, Pollokshields, Glasgow, S.1.**

Notice to Contributors

British Birds publishes material dealing with original observations on the birds of Britain and western Europe, or, where appropriate, on birds of this area as observed in other parts of their range. Except for records of rarities, papers and notes are normally accepted only on condition that the material is not being offered to any other journal. Photographs (glossy prints showing good contrast) and sketches are welcomed. Proofs of all contributions are sent to authors before publication.

After publication, 25 separates of papers are sent free to authors (two or more authors of one paper receive 15 copies each); additional copies, for which a charge is made, can be provided if ordered when the proofs are returned.

Papers should be typewritten with double spacing, and on one side of the sheet only. Shorter contributions, if not typed, must be clearly written and well spaced.

Notes should be worded as concisely as possible, and drawn up in the form in which they will be printed, with signature in block capitals and the writer's address clearly written on the same sheet. If more than one note is submitted, each should be on a separate sheet, with signature and address repeated.

Certain conventions of style and layout are essential to preserve the uniformity of any publication. Authors of papers in particular, especially of those containing systematic lists, reference lists, tables, etc., should consult the ones in this issue as a guide to general presentation. English names of species should have capital initials for each word, except after a hyphen (e.g. Willow Warbler, Black-tailed Godwit), but group terms should not (e.g. warblers, godwits). English names are those used in *The Handbook of British Birds,* with the exception of the changes listed in *British Birds* in January 1953 (46: 2-3). The scientific name of each species should be underlined (but not put in brackets) immediately after the first mention of the English name. Subspecific names should not be used except where they are relevant to the discussion. It is sometimes more convenient to list scientific names in an appendix. Dates should take the form '1st January 1965' and no other, except in tables where they may be abbreviated to '1st Jan.', 'Jan. 1st', or even 'Jan. 1', whichever most suits the layout of the table concerned. It is particularly requested that authors should pay attention to reference lists, which otherwise cause much unnecessary work. These should take the following form:

TUCKER, B. W. (1949): 'Species and subspecies: a review for general ornithologists'. *Brit. Birds,* 42: 129-134.

WITHERBY, H. F. (1894): *Forest Birds: Their Haunts and Habits.* London. p. 34.

Various other conventions concerning references, including their use in the text, should be noted by consulting examples in this issue.

Tables should be numbered with arabic numerals, and the title typed above in the style used in this issue. They must either fit into the width of a page, or be designed to fit a whole page lengthways. All tables should be self-explanatory.

Figures should be numbered with arabic numerals, and the captions typed on a separate sheet. All line-drawings should be in indian ink on good quality drawing paper (not of an absorbent nature) or, where necessary, on graph paper, but this must be light blue or very pale grey. It is always most important to consider how each drawing will fit into the page. The neat insertion of lettering, numbers, arrows, etc., is perhaps the most difficult part of indian ink drawing and, unless he has had considerable experience of this kind of work, an author should seek the aid of a skilled draughtsman.

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The behaviour of the Gannet

By J. B. Nelson

(Plates 41-47)

INTRODUCTION

Gannets *Sula bassana* were studied from 1960 to 1963 on the Bass Rock (plate 41a), which is situated at 56°04'N, 2°38'W in the Firth of Forth. This paper aims to give a full description of their main behaviour patterns (excluding chick care and the development of behaviour in chicks, which will be treated separately) with an analysis of the situations in which they occur. Beyond this the causation, adaptiveness (or function) and evolutionary aspects of Gannet behaviour at the breeding colony are of great interest and will be kept constantly in mind. Some of the ecological findings have already been published elsewhere (Nelson 1964a, b). A review paper containing an outline of some of the Gannet behaviour here described in detail has also appeared (1964c), though pre-dated in writing by the present account.

Previous accounts of Gannet behaviour are fragmentary (Armstrong 1942, Gibson-Hill 1948, Perry 1948, Fisher and Lockley 1954 and Barlee 1956), although Warham (1958) has well described some behaviour in the Australasian Gannet *S. serrator*. Several Gannet behaviour patterns (e.g. male advertising, female facing-away, the sideways head shake in its many contexts) have not previously been described and virtually nothing has been written about the causation and function of the remainder.

Several recent studies have related diverse features of a bird's ecology, behaviour and structure to some major adaptive theme. Von Haartman (1957) demonstrated the relationship between hole nesting and the behaviour of the Pied Flycatcher *Muscicapa hypoleuca*; E. Cullen (1957) related Kittiwake *Rissa tridactyla* behaviour to cliff nesting;

Phillips (1962), in experimental work with gulls (though the findings may have wider applications), connected plunge-diving with the presence of white on the head and under-parts, which reduces conspicuousness to fish; and Crook (1962) showed how the process of contact and pair bond development in weaver-birds may be related to their feeding habits, dispersion and sexual or seasonal dimorphism. Tinbergen and co-workers are gradually uncovering the entire anti-predator system in the Black-headed Gull *Larus ridibundus*, which affects many features of its behaviour such as spacing out of nests, egg-shell removal (Tinbergen *et al.* 1962) and roosting habits. In the present study the implications of dense colonial nesting (mainly on cliffs) coupled with strong site attachment and aggression gradually emerged as central aspects of the Gannet's breeding biology and behaviour. Correspondingly, these will be discussed in detail; they have an important bearing on the wider topics of population dynamics, including recruitment rate (deferred maturity, non-breeding adults, clutch size). Site acquisition and defence involves violent and persistent aggression and seasonally prolonged and concentrated site attendance. Both these have associated disadvantages. I hope to show that Gannet behaviour often represents an adaptive compromise between conflicting selection pressures.

A convenient framework for the description of behaviour is the succession of events in the annual breeding cycle. Before this a brief account of voice and some morphological characters involved in display is relevant.

STUDY AREA AND METHODS

I was fortunate enough to live on the Bass Rock for part of 1960, followed by continuous spells (February to October or November) in each of the three seasons following; my wife joined me for most of this time. In the main observation colony—some 300 nests and sites* on sloping ground at the top of the north-west face—171 adults were ringed with individual combinations of coloured, spiral chicken rings and B.T.O. rings. This group had a clear inland boundary which facilitated the plotting of each new nest or site in the 'fringe'. A rapid extension of this boundary occurred in three annual 'waves' and some 90 new nests or sites were added. Behaviour involved in site establishment and pair formation could therefore be watched closely; both are among the more difficult processes to observe in most birds.

Two hides were used and the birds soon ignored them. A portable tape-recorder was used to detail rapid and complicated interactions and a ciné-film of the main behaviour patterns was used for drawing certain

*A nest is defined as a small, fixed area which is defended and contains nest material. A site is a small, fixed area which is defended but contains no nest material.

sequences. Since most of the Bass Gannet population* nests on cliffs or steep ground near the top of cliffs, behaviour recorded from the observation group was checked by observations on cliff birds.

MORPHOLOGY AND VOICE

This aspect has been treated previously (Nelson 1964c), but is included with additional comment here because of its relevance to Gannet displays. The North Atlantic Gannet is given specific rank along with the Australasian Gannet and the South African or Cape Gannet *S. capensis*, though the differences in morphology are very slight. Many authors place all three in the genus *Morus* to distinguish this group of true temperate-water Gannets from the pan-tropical booby genus *Sula*. In the Gannet the sexes are much alike in voice and appearance. Reversing the situation in all other members of the Sulidae, male Gannets are slightly larger and heavier than females, with bigger beaks (male culmen average 100.2 mm., range 93.5-110, 33 measured; female average 98.9 mm., range 94-104, 31 measured). This difference may be connected with aggression, which is stronger in Gannets than in other Sulidae and also greater in the male than in the female.

The whole family shows facial patterns of highly coloured soft parts and bills. Gannets have yellowish (ranging from pale yellow to deep orange-buff) heads and necks, pale blue beaks with conspicuous black lines running horizontally along them, and black skin extending above the ice-blue eyes to the corners of the gape and also as an extensible black strip on the gular pouch and throat. Since the head is a focal point in many displays involving its presentation and withdrawal, the conspicuous lines may aid the communication value of these movements. There are many well-known examples of such 'markers': for instance, the black cap of the Arctic Tern *Sterna macrura* is tilted differently in movements with different signal values (J. M. Cullen 1956), the hood of the Black-headed Gull is used in 'head-flagging' (Tinbergen and Moynihan 1952), and the specula of ducks are touched in stylised manner (Lorenz 1941).

The Gannet's yellow head colour shows a sex difference, being usually paler and (particularly late in the season) spotted with white in the female. Since there is much variation in this character and in different years the same individual may be lighter or darker than its mate, it cannot safely be used to sex birds, though the darker of a pair will probably be the male. Whereas the greater spottiness of the female is due to a moult difference (not, as has been suggested, to the biting of the female by the male; unmated females become spotty too) the paler colour is clearly a pigment intensity difference.

*In June 1962 we counted the Gannets and found some 5,300-5,700 breeding pairs; 1,300-1,500 pairs with nests or sites but no eggs or chicks; and 2,000-2,500 non-breeding birds, including adults and immatures, without nests or sites.

Unlike other members of the family, Gannets have conspicuous greenish lines on the toes and fusing on the tarsus, providing a fairly reliable means of sexing. In males the green tends to yellow and in females to blue. Again there is overlap, but when a pair are together the sexes can usually be recognised. In extreme cases solitary individuals can be sexed. The function of lines standing out so clearly against the blackish webs is probably to emphasise the movement of the feet in the Gannet's pre-flight posture. Similarly, the Blue-footed Booby *S. nebouxii* uses its astonishingly conspicuous blue feet in an exaggerated 'parading' movement, and also flings them upwards and slightly outwards, fully spread and showing the soles, when it flies in to the nest site in the early stages of pair formation.

Like most sea-birds the Gannet has extremely few calls. It relies for communication mainly on visual signals. The voice shows no sex dimorphism, in contrast to some boobies in which, due to a sex difference in the structure of the syrinx (Murphy 1936), males whistle and females shout harshly. Nevertheless, individual differences in voice enable the Gannet to recognise mate and neighbours as they fly in. Chicks also recognise the voices of their parents. The main call, usually associated with aggression, is a strident *urrah rah rah*, given by both sexes about four times per second when flying in to the site (we shall see later that this involves some aggression). The pace of the syllables accelerates, their loudness increases and a final 'shout' is given just before touch-down. Much the same call is given by both sexes when fighting, in threat behaviour, during attacks on chicks and in some displays. The alarm version is loud and staccato, repeated three or four times on a descending scale.

During take-off and often after a hop or run a soft *ooah*, attenuated and sometimes disyllabic, is uttered. Just before or during take-off from a ledge this call often resembles a low groan, and is usually accompanied by a special posture (plates 46b, 47a and 47b) preceding movement. Because it is often given from a strained position, neck stretched and tail acutely depressed, it has been suggested to result involuntarily from physical contortion. However, it is produced by birds in all sorts of normal positions, including flight, and may be absent from the contorted ones: it is almost certainly produced 'voluntarily'.

A call resembling the soft *crok* of a Raven *Corvus corax*, and apparently not previously recorded, was sometimes heard from Gannets in fast, level flight.

BACKGROUND INFORMATION

The reader may wish to relate the following points to some part of the detailed account, even though they fall outside the scope of the present paper: Gannet nests and pairs are more or less permanent; adult life

expectation is about 16 years; they usually breed first at five years after holding a site for all or part of the previous season; eggs are laid mainly between mid-April and mid-May, exceptionally in March and June; breeding success is high (in terms of fledged young from eggs laid it averaged 73% over three years). There are plenty of new sites available on the Bass which are in no way topographically unsuitable unless Gannets require features so subtle as to be unrecognisable by detailed comparison with sites already in use. There are many adults among the immature birds gathering in 'clubs' at various points on the Rock, and these are probably non-breeders rather than off-duty breeders.

SITE ESTABLISHMENT

It seems probable that Gannets, although now often nesting on flattish ground, were originally and are still primarily cliff-nesters, as indicated by their many adaptations to cliff nesting (e.g. fighting method described on page 242, ability to 'cement' nests, behaviour of young, and many others).

Gannets strongly tend to nest in the colony of their birth, often close to the nest from which they fledged or, in any case, close to other nesting birds of the same species. Particularly large numbers of Gannets in the observation colony were ringed by other people between 1955 and 1959 and the high proportion of ringed birds (41%) establishing sites on the fringe of this group during the present study showed that many of the birds ringed there as chicks returned to breed for the first time within a few score yards of the area of their birth. Had they scattered over the entire Rock, such a concentration, in one small section, of ringed four- to five-year-olds could not have ensued.

There is a strong tendency to nest within about three feet (the pecking distance) of birds already established, which leads to the typical compact structure and expansion of Gannet colonies (plate 44). Dense nesting is often supposed to derive from ultimate shortage of sites, but in many species the advantages are probably of another kind (e.g. anti-predator). Even in the first respect it has often been remarked that suitable areas are neglected in favour of others nearer existing nests. Wynne-Edwards (1962) suggested that dense colonial nesting is also part of the social machinery limiting breeding areas and partly regulating the admittance of new breeders. However this may be, it seems that the dense colonial breeding so characteristic of the Gannet is not forced upon it solely by the shortage of nest sites at present. There must also be other advantages whose nature remains to be demonstrated. Synchronisation of breeding to take advantage of seasonally abundant food may be one.

During winter Gannets apparently range over the sea without aggressive interaction (e.g. in feeding). The acquisition and defence of

a breeding site, however, seems to have required the evolution of intensely competitive behaviour. Tinbergen (1956) has argued that agonistic behaviour in strongly territorial birds is so important that even a slight deficiency would seriously reduce an individual's chance of successful breeding. In the Gannet aggression in the site context is so important that it has been favoured even though its effects are not confined to the situation for which it was selected, but 'out-crop' in ways which seem less adaptive but inevitable. A male which, due to outstanding aggression against other males, easily acquires and defends its site, may also be more aggressive towards its mate and chick. The responses of these will be influenced (as indeed they have been) and the raw material provided for the development of progressively more efficient appeasing behaviour (page 267). In this way one important behaviour system can influence much of a species' biology, as aggression has done in the Gannet. The development of any one trait is eventually limited by the general requirements of the species. Thus, the relationship between Gannet mates is, at one stage, already so fine that the slightest 'false move' by the female may release violent aggression in the male. Still more aggressive males might well attack too often and too strongly and so reduce their chances of pair formation. Similarly, the fear tendency must be adequately developed so that aggression is expressed only in the 'right' situations. Males which always fought and never fled would quickly be eliminated.

Male Gannets usually establish and maintain a precise site for all or part of the season prior to that in which they first breed, in contrast, so far as known, to other British seabirds except the Cormorant *Phalacrocorax carbo* (Kortlandt 1942) and possibly the Fulmar *Fulmarus glacialis*. Arctic Terns, at the other extreme, may choose the nest site only a few hours before the first egg is laid (J. M. Cullen 1956).

Period over which sites established

Table 1 shows the dates on which sites were established. In 52 out of 53 cases breeding did not occur until the season after establishment. Sites established relatively early in the season were attended more than were later ones, where attendance was often sporadic. Birds late in establishing a site but regular in attendance usually bred the following year. Other late males either abandoned the site or held it for a full subsequent season before breeding. 'Squeezed in' sites (page 240) were more consistently guarded in the early stages than fringe ones and also returned to earlier in the following year, possibly due to the greater social stimulation experienced there (*cf.* Kittiwakes: Coulson and White 1960).

Method of site establishment

The following details refer to birds newly establishing sites. Experi-

Table 1. Dates of site establishment by Gannets *Sula bassana* on the Bass Rock in 1961 and 1962, shown in half-monthly periods

	April 1	April 2	May 1	May 2	June 1	June 2	July 1	July 2	August 1	August 2	Total
Sites established	5	8	12	13	10	1	0	0	4	0	53

enced breeders simply return and occupy their old nest (or site if the drum has disintegrated) performing the ownership display (page 248) when stimulated by intruders.

Site establishment is preceded by aerial reconnaissance mainly over a particular area. It is impossible to keep an individual in sight for long but hundreds of fragmentary observations, supported by the behaviour of a dyed male, indicated that regular flight reconnaissance preceded the first tentative attempts to obtain a site. To avoid unnecessary fighting, it is essential that, in the later stages, they should be able to pitch unhesitatingly on to the exact site, perhaps in the midst of a nesting mass. However, the assertion (Palmer 1962) that accidental trespass of this kind can lead to severe fighting and even deaths seems quite wrong; such birds are only too willing to escape and hardly ever retaliate except to aid their getaway. Only intruders with territorial 'intentions' fight back.

Prolonged scanning of the nesting group is followed by ground reconnaissance from an unoccupied nest or vantage point, or from the fringe. I recorded five different males successively occupying a vacant nest in two to three hours, each being displaced by the owner who had joined a widowed female near-by. This shows the constant pressure exerted by young males attempting to take over empty nests and the premium on guarding them. Before a male will fight in defence of a site he must have occupied it for at least a few hours and probably two or three days or more. Owning males returning from foraging, which often takes two or three days, thus usually re-assert themselves without serious fighting. The tendency of young males to return to the breeding colony only after most of the old males are back in residence may be a further adaptation to this end.

Males establish sites by taking over existing nests, squeezing in between them or (as in the fringe of the observation colony) establishing themselves in a new area, usually very close to an existing group.

Taking over existing nests. The low adult mortality rate of 6% (calculated from the annual return of colour-ringed individuals) and the female's continued attachment to the site if the male dies means that each year few nests are vacated by both owners. Within the group of ringed birds only four such cases were recorded, although the 'taking over' process is responsible for maintaining the stability of Gannet

colonies. In cases where one partner dies it is usually replaced appropriately: in other words, the male continues to hold the site and finds a new mate, or the female accepts a new male who may have taken over in her absence. In some cases established females returning late were unable to oust new females whose attachment to the site, in the presence of the experienced male, quickly became strong enough to defeat attempts by the former owner to regain the site. The converse rarely occurred.

Lockley (in Fisher and Lockley 1954) has stated that young Gannets take up the outer edges of a colony and that the inner section consists of older birds. This is true only of an expanding group. Since in a stable population there is no reduction in density in the old-established (supposedly central) parts it follows that the first-time breeders take over nests scattered throughout, and are not concentrated on the outer fringes. Such nests will occur evenly in a group unless the edge suffers more from predation. Where, however, a general or local increase is taking place, newcomers will, as in the observation colony, establish sites on the fringes. Without knowing whether the population is stable or expanding one cannot deduce that the age of the birds in the centre of the colony is on average greater than at the fringe.

'Squeezing in' between existing nests. The density and regularity of old-established groups is greater than newer ones, due partly to the initial tendency of new birds to defend a larger area than they later maintain, leaving gaps which are only gradually filled. Slight adjustments of nest positions also occur after winter disintegration of drums and help to achieve even dispersion. Nevertheless, it sometimes happens that a spot which, because of its smallness or difficult position, has remained empty for years, is suddenly adopted by a male who clings to it despite fierce hostility from neighbours. It is tempting to speculate that such males were born near-by and are for some reason, possibly a conspicuous landmark, particularly stimulated to return there (page 237). On average only one male chick would survive to breeding from the offspring of such an area over many years, so possibly explaining the sudden and tenacious adoption of these unlikely spots.

Establishing a site in a new area. The pattern of site establishment in the fringe of the observation colony (where most of the observations were made) was revealed by twice-daily checks and large-scale mapping. Newcomers were wary and no attempt was made to ring them. However, the return of birds colour-ringed as chicks (over 600 were marked in the observation colony during 1960-63) will eventually provide recognisable individuals. The dyed male mentioned earlier confirmed points deduced from unmarked birds.

Site establishment involves readily recognisable behaviour which, together with the length of time spent on the site, shows whether birds are in earnest or mere casual visitors. A male laying claim to a spot,

which in the early stages may be simply a patch of grass without distinctive features, flies in calling and makes a characteristic nest-biting movement after landing there. If there is no nest material he bites the ground or makes intention movements of doing so, still calling loudly. This (or equivalent) aggressive behaviour is widespread in the Sulidae. In its primitive form it is simply a nest-biting or touching movement, often with widespread wings, but in the Gannet it has also given rise to a more elaborate site-ownership display, bowing (page 248). Males bent on establishing a site threaten other males wandering near-by, bow frequently and when relatively idle stand in a relaxed manner with retracted neck, preen or sleep. By contrast, an intruder or casual visitor lands without calling or nest-biting and stands in the anxiety posture with long neck and sleeked feathers, scanning the neighbourhood. He does not bow or show marked aggression towards birds near-by, but is, on the contrary, easily displaced by challengers. Since individuals later establishing themselves first come to sites as casual visitors it follows that the transition stages are difficult to recognise. Some immatures spend most of a season in the preliminary stages, showing only weak attachment to a particular spot. The longer a bird spends on a site the more bitterly he will fight to retain it.

Aggression and the site

The site is the Gannet's only territory and is used for pair contact, copulation and breeding. In the male three forms of aggressive behaviour—fighting, threat and ritualised (aggressively motivated) display—are connected solely with the site. Gannets, though highly gregarious when fishing, gathering nest material or resting on the sea, are not in these circumstances aggressive. During communal gathering of nest material they may snatch grass from each others' beaks, but I never saw even the mildest fighting. Even when crowded together devouring trawler offal they rarely squabble, in strong contrast to Herring Gulls *Larus argentatus*. When breeding birds meet on the fringe of the colony (perhaps en route to a take-off point) they are not aggressive. Yet on their sites they become fiercely hostile.

Tinbergen (1956) emphasised the balanced nature of agonistic behaviour and Lack (1954) similarly stated that in territorial behaviour the avoidance response of non-owners is as important (or more) as the aggression of the owner. Nevertheless, though it is true that in the Gannet all except serious contenders for the site either avoid males guarding their sites or flee when menaced, severe fighting is common. All references to aggressive behaviour in sea-birds which I have found indicate that Gannet fighting is quite exceptional in frequency and severity, although Tuck (1960) recorded 'severe mortality' due to fighting among Razorbills *Alca torda* at Akpatok Island.

Fighting (fig. 1, plate 45c). Male fighting functions as part of the

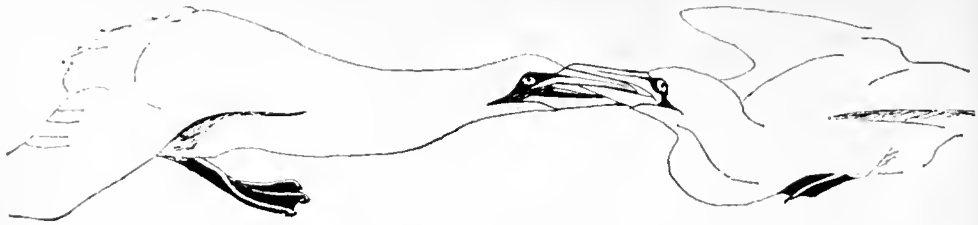


FIG. 1. Territorial fighting. With extended neck one pushes the other away from the site. Interlocked beaks make it impossible for either to disengage at will. This fighting method seems better adapted to cliff ledges than flat ground

process of site establishment and maintenance. Of 53 sites whose establishment was followed in detail 34 were known to involve at least one fight. A total of 57 fights were recorded for them and this figure, of course, represents only a proportion of the real number.

Fighting often begins in earnest after high intensity threat behaviour (plate 45a) but does not require this as a necessary first stage; often one bird lands and dashes straight against the other. The combatants interlock bills (fig. 1) and attempt to drive each other from the nest or site; strong pushing movements of the legs, with feet curved for better grip, are transmitted to the opponent through straining body and extended neck. The wings are threshed around and the tail spread and depressed against the ground for increased leverage. Although the beak is the focal point for attack, other parts of the face, head and neck are also seized; the birds shift grip with amazing speed and intersperse slashes, stabs and worrying or shaking movements with the main, tense pushing.

During fights damage is inflicted on both combatants by surrounding birds, particularly where the head of one is held as it were on the chopping block of the opponent's beak, and the pecks of neighbours are powerfully effective. It might therefore be inferred that the pushing with extended neck enables one to thrust away the opponent whilst itself remaining on the site and so escaping attacks from neighbours. In fact, the winning bird makes no attempt to remain on the site during a fight; on the contrary, he drives his opponent before him, ignoring the bites of enraged neighbours.

It is worth emphasising that this method of pushing with extended neck (made possibly only because of the Gannet's extremely strong neck developed for plunge-diving) is well-suited for displacing an opponent from a cliff ledge. Gannet fighting has probably evolved its present characteristics in the context of cliff nesting, to which it is functionally best adapted (*cf.* the Kittiwake's method of 'twisting' an opponent off the ledge: E. Cullen 1957). The apparently dysgenic severity of fights in flatter parts of the colony may have resulted from

the application here of a fighting method evolved in a different context in which an important factor was the tendency of one or both birds to fall or be pushed off the ledge, so ending the struggle unless it is renewed in the sea below. This would partly explain such severe fighting which runs counter to the general situation in birds, where displays replace it; if fighting did not evolve under flat conditions, no wonder it is poorly adapted to them. Further, Gannets sometimes attempt to displace opponents by diving on to them in a typical shallow fish-hunting dive. Whereas this is effective against a ledge opponent it is, of course, futile on flat ground. In its use of a behaviour pattern primarily evolved in an entirely different context, here fishing, the Gannet may be compared to the Sparrowhawk *Accipiter nisus* which uses hunting behaviour to break off twigs for its nest (Bal 1950).

The length of extreme Gannet fights is partly due to the surroundings and also to a strong tendency shown by dominant rivals to deny escape to the opponent. Even when the latter tries to pull loose and flee the other hangs on or pursues him and renews the struggle. This may be to inflict a sound defeat and lessen the chance of further challenge from that rival.

The eyelids do not protect the eyes during fighting but the semi-transparent nictitating membrane is drawn across as a reflex response to any anticipated contact. The lens can withstand fierce jabs and must somehow be exceptionally well-protected. Gannets, unlike Shags *Phalacrocorax aristotelis* (Snow 1963), do not avoid each others' eyes when mutual preening and certainly not when fighting. Birds caught whilst sleeping off the effects of a severe fight (which they sometimes do for three full days) often bore nasty wounds; in one most of the eye tissue was hanging out of the socket (plate 45b), another had the eye socket filled with blood and a third had an opaque eye. Others had deep cuts in the facial soft parts and one had a deep peck wound near the oil gland. The head is often pock-marked and bleeding where neighbours have stabbed it hard. One bird died from a peck wound in the abdomen. Extreme exhaustion and filthy, tattered wing and tail feathers caused by the wild threshing are further consequences underlining the severity of these struggles which may last up to two hours virtually non-stop. Yet it should also be said that adult mortality due to fighting is, despite its ferocity, totally insignificant.

Males use a different method when attacking females, which they seize by the scruff of the neck and force away. This is partly due to the female's appeasement behaviour in which she faces away, thus hiding her beak from the male.

Females fighting in the presence of the male (but not vice versa) are unwilling to carry the fight off the site, not to avoid punishment from neighbours, but to remain as close as possible to the male who, rather

than the site, is usually the object of dispute. Such females always attempt to push against the male and will quietly endure sustained attack from the rival so long as they occupy this coveted position. Once dislodged they renew the struggle with great bitterness. When the male is absent, however, females show the male pattern of fighting, pursuing the opponent some distance from the site.

In fights between females the one willing to accept the greatest punishment usually wins, though not necessarily the rightful owner or the most aggressive (by vigour of attack). The male tends to switch his attack to whichever female is losing at the time. He is obviously puzzled and shows conflict behaviour throughout (nest building movements, comfort movements and so on). Occasionally in the heat of the struggle both females mistake the male for the opponent and by the fury of their combined attack drive him ignominiously from the site.

In summary, fighting in the Gannet is uncommonly severe; it is an effective method of settling site disputes, and is probably adapted to cliff nesting, which would explain some of its features, including biologically undesirable severity on flat ground. There are sex differences in fighting procedure.

Fighting and the morphology of the sexes. Although females do not establish the site they quickly form a strong attachment to it and will then share in its defence. In birds, shared defence of territory is usually associated with similar plumage in the sexes, just as in territorial species showing unequal aggression, the more aggressive, usually the male, is more conspicuously coloured. In most colonial sea-birds the sexes look alike, but defence of territory is by no means always (if ever) equally shared. Male Kittiwakes, for example, usually do most of the fighting (E. Cullen 1957). It is not completely satisfactory to suggest that the similar appearance of the sexes confers equal valence as a deterrent to intruders through common possession of threat characters, since, despite this, the sexes readily recognise each other (e.g. Black-headed Gull: Tinbergen 1956; Kittiwake: Cullen 1957; and Gannet). Therefore a female's resemblance to a male may not in itself add to her intrinsic deterrent value. In any case, since she is herself aggressive such resemblance would be of slight advantage here. In fact on occasions it would benefit the female to differ conspicuously since during fights between two females the male is sometimes mistakenly attacked by one of them and his subsequent retaliation may decide the issue against her. Nevertheless, at this stage it may be assumed that the close morphological similarity is connected with shared defence of territory; general features such as the pale ventral surface in both could, of course, possess survival value in quite different contexts such as fishing (see Phillips 1962). In the Woodpigeon *Columba palumbus*, where the sexes are similar and defence of territory is shared, the male does *not* seem to recognise a female

except by her behaviour, particularly the way in which she reacts to aggression (Cramp 1958).

Threat behaviour (fig. 2, plate 45a). Obvious threat behaviour between neighbours consists of incipient overt aggression with jabbing and an extremely common stereotyped behaviour pattern here called 'menacing' and interpreted as a ritualised form of threat behaviour (see below). It is an interesting fact that all four boobies with which I am familiar (*S. sula, S. dactylatra, S. nebouxii* and *S. variegata*) lack the ritualised menace, which one might well have expected to occur throughout the family as the 'normal' expression of hostility. *S. variegata* has the most comparable threat behaviour; it too is a dense and primarily cliff nesting species.

Incipient aggression is intermediate between fighting and stylised menacing and mostly occurs as high intensity agonistic behaviour between newly-established pairs or strong rivals, often when more serious aggression is likely to follow. The rival is threatened by thrusting towards him a widely-opened bill, whose lower mandible often twitches spasmodically. It is accompanied by strident aggressive/fright calling, and unlike the stereotyped menacing frequently results in beak gripping.

Gannets menace from standing, sitting and incubating positions. In encounters between equals the beak is opened and thrust with a marked sideways twist of the head towards the opponent and then withdrawn. The withdrawal is clearly a 'pre-set' part of the behaviour and does not depend on aggressive reaction from the opponent. Insofar as the sideways twist and withdrawal are exaggerations of menacing, and probably enhance its signal value, they are evidence for its ritualised nature. Although one bird initiates the menacing bout, the movements of the participants often synchronise. Although near enough to bite, established birds rarely do so in these encounters—hardly surprising when one realises that during the nesting season each bird menaces and is menaced thousands of times. To give an idea of the frequency of menaces the data in fig. 3 can be arranged to show that

FIG. 2. Threat behaviour. Two menace each other in site dispute. Note the turning of the left-hand bird's head and the withdrawn position of the other's

every bird, during the time spent singly on the nest throughout the season, menaces a neighbour more than once per hour in the hours of daylight. The value of ritualisation is evident here, since it would be extremely wasteful and inefficient if even a small proportion led to real fighting.

Pairs menaced pairs about half as frequently, but when they did so both birds menaced their own sex most, as one would expect from the nature of the pair relationship. Singles were more likely to be menaced by pairs (if adjacent) than by other singles, and were also more likely to be seized.

Menacing between hostile birds, when judged from knowledge of the situation to be intensive, is associated with head shaking, frequent touching of nest material, repeated pelican postures (to be described in part 2) and bowing.

The form of menacing, the situations which elicit it and the actual attack to which it may lead show that it is at least partly aggressively motivated. Although clearly hostile (all stages between ritualised menacing and fierce fighting occur), it acquires certain overtones during the course of co-existence with neighbours. Whilst even slight intrusion immediately elicits full threat behaviour, perfunctory menacing occurs on countless occasions, sometimes without visible cause, at very low intensity and without calling. Fig. 3 shows the seasonal incidence of menacing estimated by systematic five-minute counts of its frequency among two standard groups of 20 nests. The higher incidence towards the beginning and end of the season corresponds with a similar trend in bowing and may be partly due to the relatively high level of external stimuli eliciting aggression at these times (wandering birds, prospectors and so on).

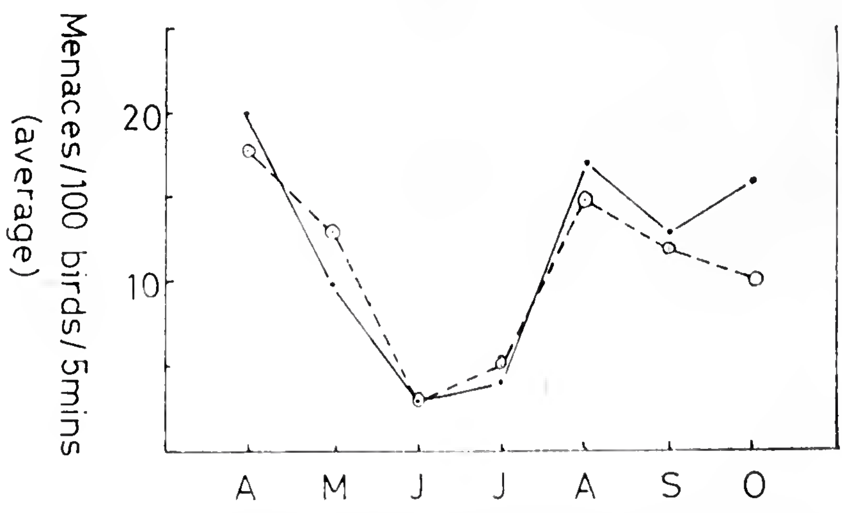


FIG. 3. Frequency of menacing (threat behaviour) throughout the season. Counts from two separate groups are shown by continuous and broken lines

Menacing helps to ensure the characteristically regular spacing-out within the colony. The most intense and prolonged (half an hour or more) bouts occur when site boundaries are least well-defined, soon after establishment. Such behaviour may even prevent successful breeding by squeezed-in pairs and in at least one case hostility by neighbours drove away an old male and his newly-acquired female. Although in breeding groups on flatter ground each nest is normally just beyond practicable jabbing distance of the neighbours, inserted pairs once accepted may be tolerated even when the wing tip or tail actually touches a neighbour. Again, even stereotyped reaction shows modifications which could lead to important changes in habit (e.g. denser nesting).

Bowing (fig. 4, plate 42a). As in most birds and despite the fighting and menacing, Gannet aggression on the site mainly takes the form of displays. The commonest and most conspicuous of these may be descriptively termed 'bowing' (the 'wing bow' of Perry 1948 and the 'curtsy' of Lockley 1954 and Warham 1958). Since this movement plays an important part in the Gannet's social behaviour and also well illustrates several general points concerning displays it will be described in detail.

Description. A full male bow is a stereotyped movement taking four to twelve seconds, and performed from a standing position with neck slightly elongated, but not stretched as in the 'anxious' long-necked position. The first movement is usually a sideways head shake, starting slowly and increasing in speed and amplitude. The bill is inclined slightly downwards, or sometimes held horizontally. After one to five head shakes the head and thorax are bowed forwards and downwards in a smooth sweep alongside either wing or foot* (occasionally between the feet). This gives the bow its distinctive character, the whole forepart of the body moving, not just the head. Often the tail is raised or even cocked vertically, probably for balance. Between each forward movement, of which there are three or four (termed 'dips' to distinguish them from the entire performance or 'bow'), the head is raised and shaken rapidly from side to side.

During the bow the wings are held away from the body, either widely spread like a Cormorant 'wing-drying', or merely hung loosely. Commonly, the wing tips are crossed and the carpal joints held well away from the body, the bird, from behind, resembling an equilateral triangle. As the bow proceeds the wings often open more widely. The normal wings-out position is adopted, in contrast to the special 'wings-busked' position peculiar to sky-pointing (see fig. 14b in part 2).

After the final dip the wings are folded and the bill tip pressed tightly

*Out of 669 recorded, 44% dipped to the right and 56% to the left. This difference is statistically highly significant and completely puzzling. Warham (1958) also noticed this tendency, though he did not give actual figures.

FIG. 4. Bowing. This aggressively-motivated display signals site-ownership. In (a) the bird is performing the 'dip' (each bow contains one to five) and in (b) the sideways head shake which occurs between dips

against the upper breast in a 'pelican position' (65% of all bows were followed by this posture—see plate 46a—to be analysed in part 2). Usually the bill tip lies to the same side of the median line as the dips and sometimes even points to the wing-bow. The pelican posture is held for two to four seconds, then gradually relaxed. Finally the tail may be shaken from side to side (24% of 372 cases). Often several bows are given in quick succession (27 in 27 minutes was the maximum recorded for one individual). During the bow the Gannet calls *urrah* loudly 10 to 30 times.

Certain individuals showed consistent and permanent peculiarities in their bows. One male had a high-flinging, rapid head shake. Another bowed lazily with the wings only a little open and with never more than two dips. Others were distinguished by stance; speed, direction and extent of dip; movement of wings; and silent bowing. Thus even within a stylised display one finds individual differences, presumably heritable, which could form material for selective modification comparable to that which has produced the bow in its present form.

To analyse the intensity of bowing I counted the number of dips, classified four positions of extent of wing-opening, timed the duration of the pelican posture and divided performances into 'co-ordinated' and 'unco-ordinated' (a measure of muscular control in terms of jerkiness or smoothness, hesitancy or assurance, which was useful in distinguishing between the bows of males varying in status). Finally, it was usually possible to classify bows as 'stimulated' when evoked by some external stimulus, such as a threat or a neighbour's bow, or 'endogenous' when performed without any obvious external stimuli. Circumstantial evidence suggests that Gannets bow in the complete absence of external social stimuli. Subliminal stimuli may nearly always

be suspected, but seem highly unlikely when isolated males bow for no obvious reason. Admittedly distant flying birds are always in view, but nesting Gannets ignore these. Further evidence for spontaneous bowing was that sleeping birds awoke, bowed and went back to sleep.

The measures of intensity given above were, in fact, linked in both sexes and bows with most dips also showed greater opening of the wings, longer pelican postures and more co-ordination. These well-marked differences were actually measured in many hundreds of bows from both sexes, though it seems unnecessary here to give a statistical analysis of the results.

Besides the above correlations a marked sex difference was found: male bows were more intense by all measures (i.e. more dips, wings further out, longer pelican posture and more co-ordinated) and also three and a half times as frequent in a sample of 1,068 bows excluding all possible factors which could influence one sex more than the other. Such sex differences in the same display provide a further objective measure of differences between the sexes in site attachment. Males establish the site, spend more time on it and are more faithful to it from year to year. Correspondingly, their site ownership display shows measurably higher intensity. Similarly, the analysis of bowing components and the measure of its frequency are quantitative assessments of intensity and with enough refinements could eventually enable things like the strength of bowing tendency in different categories of site owners (new, old, fringe, central, cliff nesting, flat ground nesting) to be more accurately assessed. A beginning was made in this study, and it was shown that newly-established males bowed more frequently than old ones; that experienced birds with no egg bowed more frequently than the same class of birds with egg and that the presence of the female greatly reduced bowing frequency in all classes of males. Also, club males showed only a female-type bow of low intensity; since the sexual and territorial behaviour of these males is highly transitory it is not surprising to find a territorial display less intense than in established birds.

Frequency. Fig. 5 illustrates seasonal changes in bowing, and shows that the frequency gradually wanes after first return to the site, even before the main egg-laying period, though it continues to decline during incubation. By comparing the incidence of bowing among birds with and without egg, though otherwise similar, it was shown that broodiness inhibits bowing. After hatching bowing increases, but only gradually, probably due to the difficulty of bowing whilst brooding a small chick. However, birds with infertile eggs show a rise in bowing as the season progresses, indicating an internal change despite the continued presence of the egg.

The gradual increase in bowing frequency following the incubation-low corresponds with a comparable increase in threat behaviour and

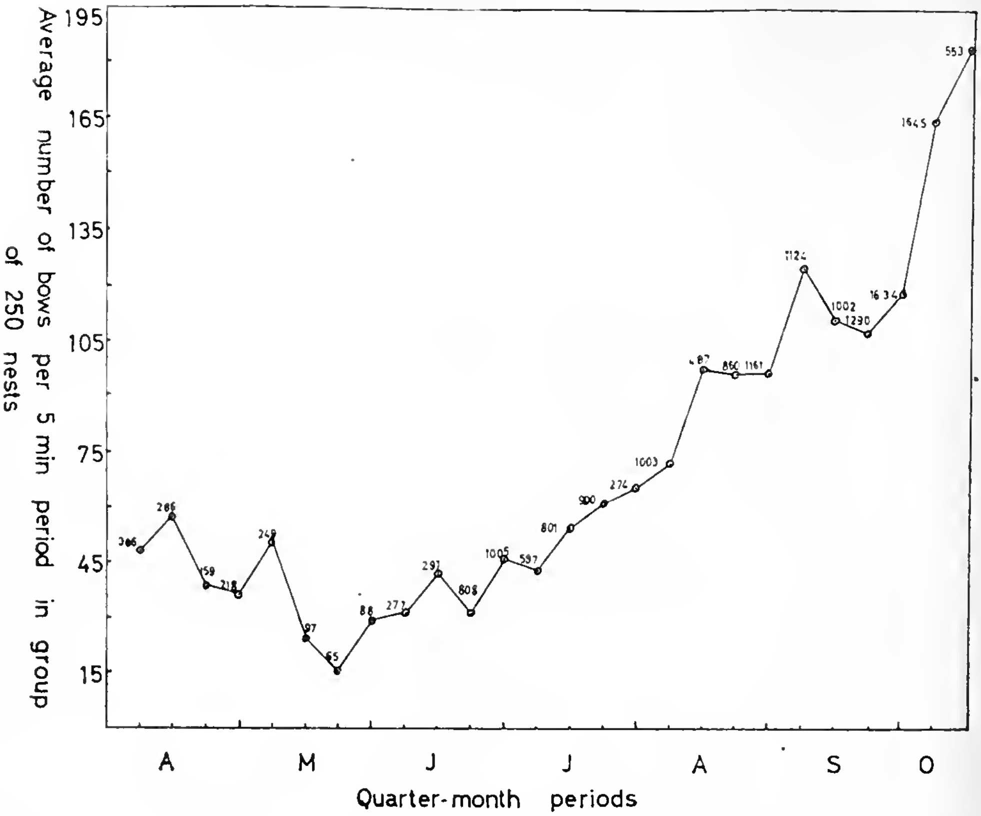


FIG. 5. Seasonal pattern of bowing in a group of about 250 nests, measured by 300 five-minute counts involving 17,270 bows. The figure above each point shows the total number of bows averaged to obtain the value

the length of mutual fencing bouts (page 269). These latter measures possibly suggest a rise in aggression which, towards the end of the season, could be correlated with both a change in the external stimulus situation (presence of large chicks or increased trespassing of some adults) and also with a rise in the internal (e.g. gonadial) contribution to aggressive behaviour. Oddly enough, however, the increase in bowing towards the end of the season takes it beyond its early season level. This late flowering of territorial behaviour seems an unusual reversal of the normal tendency in most species to show a rapid decline even *before* the culmination of breeding and certainly soon after. Thus Shags were not noted to show aggressive behaviour after the chicks fledged (Snow 1963) and Kittiwakes desert the ledges soon after the chicks become independent. On the other hand many passerines show an autumnal resumption of song, connected with a recrudescence of gonad activity. In the Gannet this late peak cannot be fully accounted for by external stimuli. The prolonged post-breeding stay at the site is not a quiescent period but a very active one.

Gannet displays do not show marked activity peaks in the post-dawn hours. Activity is slightly lower in the evening, but at all periods

arrivals and departures maintain the tempo of activity, high counts being usually correlated with a marked increase in such traffic; certain early and late counts were very high. Since prospecting females and site-establishing males are present in and around the colony all day it is not surprising that the ownership display occurs throughout. Hot weather reduces the mid-day level of activity.

Motivation. The form of a movement may indicate its motivation, as when obviously related to attack, fleeing and so on. Other criteria include the kind of behaviour with which it is associated in time, either long-term or closely (Tinbergen 1959). Evidence will be given here for considering bowing to be an aggressively motivated display in which a fear component and a 'site effect' are also involved.

Although bowing is not obviously a hostile act, it closely resembles nest-biting which is certainly aggressive (probably re-directed aggression). It is elicited by all acts of territorial infringement or the threat of such. The frequency of bowing increases about tenfold when non-breeding birds fly time and again over a nesting group. A veritable frenzy of bowing results if some crash in down-draughts. Even birds landing legitimately on their own site cause increased bowing locally. The approach of an unmated female to a receptive male elicits an inhibited form of bowing, which is in fact his advertising display, whilst in established pairs the arrival of the mate immediately gives rise to a prolonged meeting ceremony which is also a modified form of bowing. In all these different circumstances, therefore, the approach of another individual elicits bowing or related behaviour.

There is a long-term association between the frequency of bowing and other manifestations of aggression. First, the seasonal pattern of bowing follows that for menacing and where two (or more) behaviour patterns vary in the same way throughout a season parallel long-term changes in motivation are probably involved. Second, when bowing is most frequent (seasonally) mutual fencing bouts are longest (see page 271 and table 8) and their length depends on the amount of aggression between the sexes, though it may also be correlated with differences in sexual tendency. Hence again aggression and increased bowing are apparently correlated. Cross checks like these are some test of the accuracy of interpretations about any single behaviour pattern. Thus the frequency of bowing, menacing and mutual fencing all rise together, but independently of, say, comfort behaviour—a phenomenon which can be relatively simply explained if these three behaviour patterns do, in fact, have aggression as a common causal factor.

One cannot necessarily conclude that when the frequency of bowing is low (e.g. during incubation) aggression has declined. The actual expression of hunger, fear, aggression, sex and so on reflects both the strength of the readiness to respond and the external stimulus situation (perhaps further complicated by whatever other drive systems happen

to be interacting with these at the time). For example, Sevenster (1961) showed that the aggression of a male Stickleback *Gasterosteus aculeatus* to other males may remain high, or even rise, at the same time as his aggression towards a female declines. These points may make it unnecessary to invoke complicated seasonal fluctuations in the internal motivation contributing to bowing, thus simplifying further analysis of this display.

Bowing and aggression are also linked during short periods of time, since bowing is highly predictable in certain situations associated closely with overt aggression which it accompanies or follows rather than precedes. After intense fights the winner bows frequently; bowing is interspersed between bouts of jabbing and also in menacing matches; it often accompanies attacks on chicks; it is often performed by males alighting on their unguarded nest sites, a situation in which they commonly first show aggressive nest-biting. Also, if the female is on guard the male bites her fiercely before taking part in the meeting ceremony, which as noted above, is a modified form of bowing. In all the above cases aggression and bowing are closely linked.

After a fight only the winner, now occupying the site, bows, but if the contestants are neighbours, both owning sites and ready to continue the fight (i.e. still aggressive), *both* bow. Occasionally two males fight to exhaustion and both leave the disputed site, in which case *neither* bows. Thus without aggression and the nest site with which it is associated Gannets do not bow. The theory of the motivation of displays which regards them as derived from fear, aggression or sex motivation in varying balance may be inadequate to explain the site-factor in bowing, unless site and aggression are indissolubly linked in the Gannet. The increased frequency of bowing after fighting does not merely reflect a general arousal of all behaviour. Other behaviour patterns (except nest-touching and aggressive nest-biting from which bowing is probably derived) are then absent and re-appear only as bowing wanes.

In many animals aggressive displays are also thought necessarily to involve some element of fear or escape motivation. In the Gannet matched antagonists consistently bow away from each other, which probably indicates some avoidance of a potentially dangerous opponent. Many fights are started or renewed in response to the challenge of disputed ownership, signalled by bowing, and it would be hardly surprising if, in that situation, a fear element should form part of the motivation of bowing. We might therefore look for a component most exaggerated when occurring in response to some fear and perhaps reflecting escape or appeasement behaviour in some form.

The pelican posture is just such a regular and conspicuous component of bowing. Often when a pelican posture occurs by itself it does so most intensively in frightened birds. Its position at the end of

bowing fits with expectation, since at that point the bowing bird might be attacked. This view accords with the observation that 'stimulated' bows incorporate pelican postures more often than do 'endogenous' bows (70% as against 57% in males, 34% as against 21% in females) and stimulated bows were more likely to be unco-ordinated—a feature which might be expected from behaviour performed under some stress, here probably fearful rather than anything else. Further, the pelican postures were of longer duration when following stimulated bows.

It must be admitted that there are inconsistencies about this fear component as a usual part of bowing. It may be remembered that one of the characteristics of high-intensity bows (e.g. from secure, old males) is that they are particularly likely to be followed by a pelican posture and, furthermore, one of relatively long duration although there is no sign that such birds are frightened and every reason to think them aggressive. Possibly the pelican posture has become 'frozen' into the bows of secure birds and ceased in them to be quite as sensitive an indication of motivational state. Also (as will be shown in part 2) the pelican posture is itself an ambivalent aggression/fear motivated posture and may partly depend on a rate of change between these two tendencies rather than an absolute value of either.

In summary, the pelican posture varies with situation and those situations most likely to involve the bowing bird in overt aggression elicit 'stress-type' bowing with the most marked pelican postures.

Function. Direct proof of the function of complex displays is seldom possible and few authors demonstrate the accuracy of their functional interpretations of bird displays. Some (e.g. obviously aggressive but nonetheless ritualised behaviour such as menacing) hardly need demonstration.

Bowing in the Gannet is a predictable response to certain recurrent situations already mentioned, and all the evidence suggests that it functions as an ownership display of the 'distance evoking' type to repel potential intruders. Indeed (apart from obvious exceptions) bowing is the only behaviour pattern entirely restricted to the site. The chance observation of an unusual incident strikingly confirmed site and bowing relationship. An adult alighted on a piece of floating driftwood and bowed several times. Two or three others attempted to displace it; one succeeded and immediately bowed. He, in turn, was deposed and the new 'owner' bowed. Yet the usual behaviour after alighting at sea is a comfort movement, never bowing. The piece of wood was clearly treated as a temporary territory.

Bowing is most marked when there are strong ownership ties plus the need to display ownership. Males do it more than females, and especially males establishing a site, when there is more likelihood of challenge. Thus males newly-establishing themselves bow more than males re-establishing themselves on sites held previously. Also those

periods when most trespassing occurs, early and late in the season (e.g. during periods of increased 'site interest' when birds are taking advantage of absentees to steal nest material), are precisely when bowing is most frequent.

Turning to the effect of bowing on other individuals, we find that the necessary choice situations cannot be observed except by rare chance; the simple question, 'Which of two birds, one bowing and the other not, is avoided by a third?', is meaningless in practice. All birds within the breeding colony, bowing or otherwise, are avoided by all others except their mate and rivals. In the latter case bowing elicits attack rather than avoidance. Yet we would not say that bowing functions in attracting rivals. Rather it is because the rival recognises the display that he attacks and disputes the other's claim. In much the same way some song birds will permit a rival on their territory so long as he does not make some provocative gesture like singing. This attack-eliciting property of bowing in a balanced aggressive situation is very striking and leaves no doubt that the bowing has effected a response, of a kind entirely to be expected where both are 'rightful' owners. Only in unequal situations should one expect to find that bowing repels the inferior bird.

The above evidence supports the view that bowing is connected with establishment and defence of territory. In this respect it is equivalent to the agonistic displays of many passerines, gulls, waders and so on. A difference of note, however, is that in many passerines and gulls (the Kittiwake is particularly comparable because of its colonial and cliff nesting habits) the 'song' or ownership display is also the advertising display by which females are attracted, whereas in the Gannet the two displays are quite distinct although the advertising display is a modified form of bowing.

To sum up, the situations in which bowing occurs, the conditions which increase its frequency and the effect on other birds may be consistently interpreted to show that it functions in signifying site ownership and preventing site usurpation.

Derivation. Daanje, in a well known paper (1950), showed how locomotion intention movements can give rise to displays and Tinbergen (1952, 1959) has discussed in detail the ways in which displays may (or possibly *must*) be derived from simple behaviour patterns (such as intention movements and displacement reactions) which may then be so greatly exaggerated or changed that their origin becomes difficult to trace. Two parts of the bow may be traced back to such simple behaviour. First, the head shake is very similar to, and probably derived from, the sideways head shake (to be discussed in part 2) used to dispel water, dirt and the secretion of the salt gland from the head. After displacement of an intruder, when the dip grades into aggressive nest-biting, the head shake is often far more vigorous,

becoming a head-flinging movement like that used to dispose of nest debris. This is partly because the bill often becomes dirtied in nest-biting. Thus the situation determines the type of dip and the resulting stimuli determine the type of head shake. This interaction of stimuli (in which postural facilitation may play a part) may be compared with the aggressive grass-pulling of Herring Gulls passing into nest building. It could clearly form one of the steps in the progressive ritualisation and emancipation of a movement later to become fully stylised as part of a complex display.

Second, the dip in bowing is probably derived from nest-touching or biting, which is found in many Pelecaniformes as an after-landing behaviour pattern. After landing on its empty site a Gannet performs either a nest-touching or a nest-biting movement passing without interruption into normal bowing except that subsequent dips may also, for a time, include nest-biting. There seems little doubt that this primitive behaviour pattern has given rise to bowing by progressive stylisation and the inclusion of the sideways head shake. The transition from nest-biting to dipping with nest-biting and to ordinary bowing in which the bill normally no longer actually touches the nest material, now seen within a minute or two of the bird's landing at the site, gives a telescoped idea of the process which may have occurred in evolution. Bowing after landing (announcing ownership) and bowing after evicting a rival are the most predictable and probably the phylogenetically oldest bowing situations; both involve the touching or biting of nest material. Although normal bowing includes dipping without touching nest material, it seems justifiable to conclude that the dips are homologous with those of the primary situations. In fact, birds bowing on bare rock sometimes go through the motions of biting or handling nest material.

The form of the pelican posture resembles chick beak hiding—an appeasement posture in which the attacked chick tucks its bill medianally beneath its body or to one side, whilst crouching or lying. The adult pelican posture (plate 46a), which is very probably derived from this infantile appeasement behaviour, differs mainly in degree and is performed in an upright position. The adult female Gannet also shows at least one other appeasement posture (facing away: page 267, plate 43c) closely related to chick beak hiding.

In summary, the important behaviour pattern, bowing, is a complex, stereotyped and mainly aggressive agonistic display. It signifies site ownership and is performed by both sexes, though mainly and more intensively by the male. It repels potential intruders. It consists of movements which no longer fully require their original context and are in that sense emancipated. On these criteria it may be considered to be a ritualised display, derived from simpler behaviour patterns.

Table 2. Seasonal dates of first return of Gannets *Sula bassana* to the Bass Rock during 1961-63

Year	First seen near Rock	First seen on Rock	First date 1,000+ present	Last date 50% or more unguarded nests
1961	7th January	13th January	22nd January	8th April
1962	No record	14th January	24th January	11th April
1963	1st January	18th January	27th January	7th April

Site attendance

To complete the account of site establishment and maintenance it remains to consider site attendance under the headings return, seasonal duration and site fidelity. It is convenient, for comparative reasons, not to restrict discussion solely to newly-established birds.

Return. Adult Gannets are usually first seen flying around the Bass at the beginning of January or even the end of December. Unlike Kittiwakes (Coulson and White 1958), Manx Shearwaters *Procellaria puffinus* (Lockley 1942) and some other species, they do not normally gather in dense rafts on the sea before returning to the breeding site. Individuals first landing on the Rock, in mid-January, stay only a few hours and may then be absent for long periods.

The date of return is largely independent of weather; birds returned in the last quarter of January 1963, for example, when the severe weather was at its worst. They remain on their sites for a spell, regardless of conditions (which occasionally are harsh in the extreme, as anyone can testify who has watched Gannets from an exposed position in a north-easterly gale with sleet and snow in February), leave again and gradually build up periods of attendance (table 2). As late as the second week in April areas occupied by established birds, mostly experienced breeders, may be suddenly three-quarters depopulated. Sometimes this was partly due to the simultaneous departure of males who had attended their sites for two or three days without the female appearing.

In several cases the members of a known pair were first seen within 24 hours of each other. Austin (1947), Richdale (1944) and Serventy (1941) considered that Common Terns *Sterna hirundo*, Sooty Shearwaters *Procellaria griseus* and some petrels, respectively, return to their breeding grounds already paired, but did not give supporting details. Whilst it is conceivable (but improbable) that in the Gannet old pairs may meet fortuitously at sea, or even return to the colony together, such a process plays no real part in the coming together of the pair.

Newly-returned Gannets are very wary and occasionally 'panic' in the same way as Arctic Terns (J. M. Cullen 1956), whole areas suddenly clearing as the birds fly out in a cloud, apparently without reason.

Table 3. Correlation between the dates of return of Gannets *Sula bassana* to the Bass Rock and previous breeding experience, shown by the numbers of each category returning in each quarter-monthly period

	Feb.	March				April				May				
Status	4	1	2	3	4	1	2	3	4	1	2	3	4	Total
Bred at least twice	45	35	34	2										116
Bred once	4	1	9	5										19
Established a full season			4	4			1		1					10
Established end of previous season			1	2	1	1	1	2	3	10	1	1	1	24

Tinbergen has suggested that this behaviour expresses fear of land in oceanic species, which seems to fit the present case. It may be that the parts of the Rock first repopulated (mainly a broad band at mid-cliff level) are the safest and provide easiest take-off; no early birds occupy sites far away from the cliff edge and most are actually on ledges. These are also probably the oldest-established areas on the Rock. Coulson and White (1960) recorded that Kittiwakes returning first belong to the densest colonies and suggested a cumulative effect of social stimulation carried over from year to year. Gannets, however, nest at a fairly uniform density where topography allows, except in fringe areas.

Colour ringing and site mapping begun in 1960 provided four categories of returning Gannets by 1963: experienced birds having bred in at least two successive years; experienced birds having bred once only; birds which established sites early the previous year without breeding; and birds newly-established towards the end of the previous season. Table 3 summarises the return data for these groups. Older birds return first and spend more time on the site, but are also absent from the colony for long periods during the first six to eight weeks. At this stage they run little risk of losing their sites since new males do not usually prospect till April.

Seasonal duration. Experienced adult Gannets are present at the Bass from about the end of January to November; much longer than commonly thought (e.g. Wynne-Edwards 1962). In the mild winters of 1934/35 (Robinson 1935) and 1964/65 (F. Marr and the Bass keepers) some were present throughout. The annual period spent at the site, including the more intermittent attendances, is thus, at the longest, 9 to 9½ calendar months, or a third to two-thirds longer than any other British sea-bird (Shags excepted, since they often remain around the breeding area all year). Experienced birds spend about four months on the site in addition to the time required for incubation (44 days) and feeding young (94 days). These details support the remark made

earlier on the centrality of the nest site in Gannet breeding biology. Fig. 6 shows the relationship between the stay at the colony and the extent of the different phases in the breeding cycle.

Fidelity to site. Table 4 shows the proportion of colour-ringed males which returned to the same site in successive years. Since pairs generally remain constant it is usually not possible to decide whether the female is mainly faithful to the male or to the site. However, cases where the male disappeared during the winter showed that the female also has a strong tendency to return to the site as such. Of 13 such instances, the female acquired a new male on her old site in ten cases; one moved to another site within two yards; one tried unsuccessfully to pair with a neighbouring male; and one remained alone on the site but was displaced by a pair formed in her absence. Of 16 comparable instances in which males lost their females, 15 remained on the same site and acquired a new female and one moved to the next-door female whose mate had died.

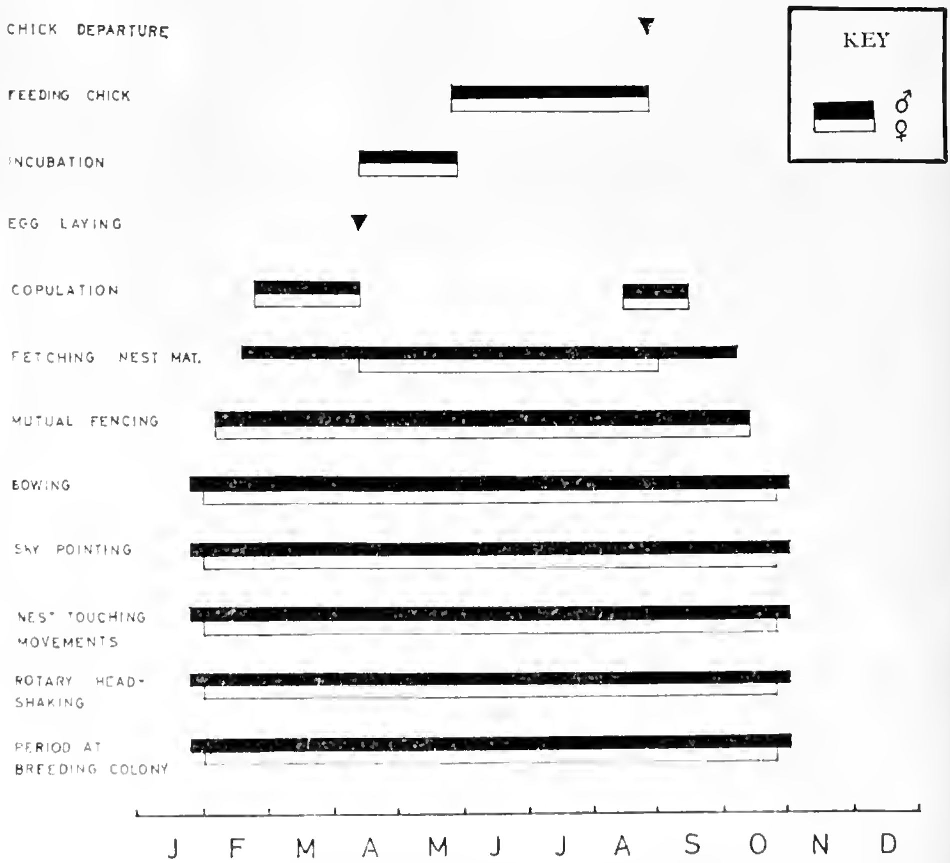


FIG. 6. Seasonal extent of various activities at the breeding colony. The periods refer to an average pair and not to the colony as a whole

Table 4. Site fidelity of male Gannets *Sula bassana* on the Bass Rock

The figures in brackets represent the number of males surviving. The number ringed in 1962 included a higher proportion of younger birds than in other years (see later). A bird unfaithful to the site in one year is not subsequently counted in this table. In the last column a further five may or may not have survived and been faithful in 1963; nests were isolated and observations insufficient

Year ringed	Number ringed	Males returning to the same nest: 1st year after ringing	1st and 2nd years after ringing	1st, 2nd and 3rd years after ringing
1960	26	26 (26)	22 (23)	14 (16)
1961	26	25 (25)	22 (23)	
1962	11	5 (8)		
Totals	63	56 (59)	44 (46)	14 (16)

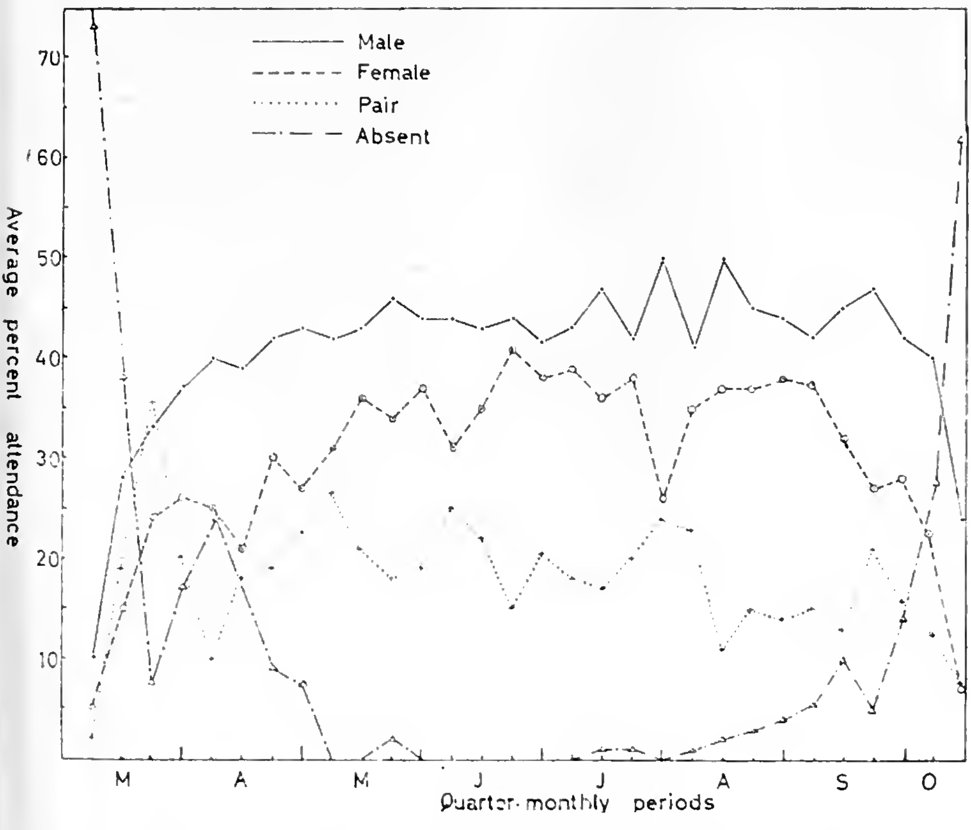


FIG. 7. Seasonal site attendance by 'experienced' individuals, based on 9,585 observations. Each point has been obtained by averaging, for many nests, the number of times the site was attended by the male, female or both during the quarter-monthly period, and expressing these as percentages of the total number of checks

Females may continue to defend their *old* site even after re-mating elsewhere, which indicates their strong attachment to it quite independent of whether there is a male there, and also independent of the location of their new mate. Such attachment is consistent with their normal site defence behaviour, including bowing. Experienced breeders show the strongest site attachment, and males newly-established late in the season show least. Failed breeders are more likely than successful breeders to change sites (13%, involving one or both partners, changed sites the year following failure, where both were known to be alive). On the whole it may well be adaptive for individuals to return to the micro-area in which they have already bred successfully, but to change it after failure.

Site attachment indicated by seasonal attendance. Site establishment is followed by a long phase of site attendance, during which a stable pair bond is achieved. In all categories (experienced, successful breeders, failed breeders, newly-established) males spend longer on the site than females, befitting their role as the sex originally establishing the site and showing greater attachment in other ways. Figs. 7, 8 and 9 give

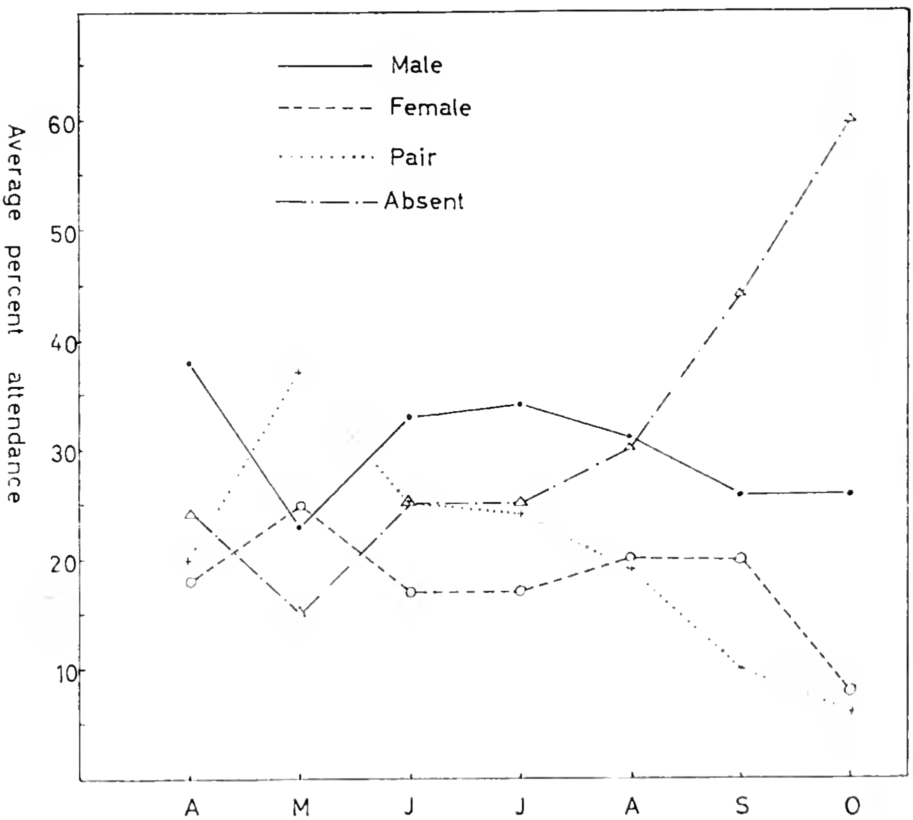


FIG. 8. Seasonal site attendance by newly-established pairs, based on 4,709 observations (see caption to fig. 7)

seasonal details of male, female and pair site attendance in experienced pairs, newly-established pairs and failed breeders respectively.

Experienced birds. Fig. 7 shows that in experienced pairs the male was recorded at the site consistently more frequently than the female throughout the season. On about 45% of all checks the male alone was on duty and on a further 20-25% he was at the nest with the female. There is no significant daily rhythm except early in the season when males and pairs are mainly in attendance later in the day.

Newly-established birds. Fig. 8 also shows a consistently higher male than female attendance, but the males are absent far more frequently than are experienced males at the same period. Nevertheless, attendance persists until October, so that despite the absence of egg and chick the male alone was in attendance on about 30% of all checks and with the female on some further 20% between April and October. This shows that the site is acquired by systematic attendance, which is far from being the expression of incipient territoriality. In fact, the male *has* shown such territoriality during the two previous years in the

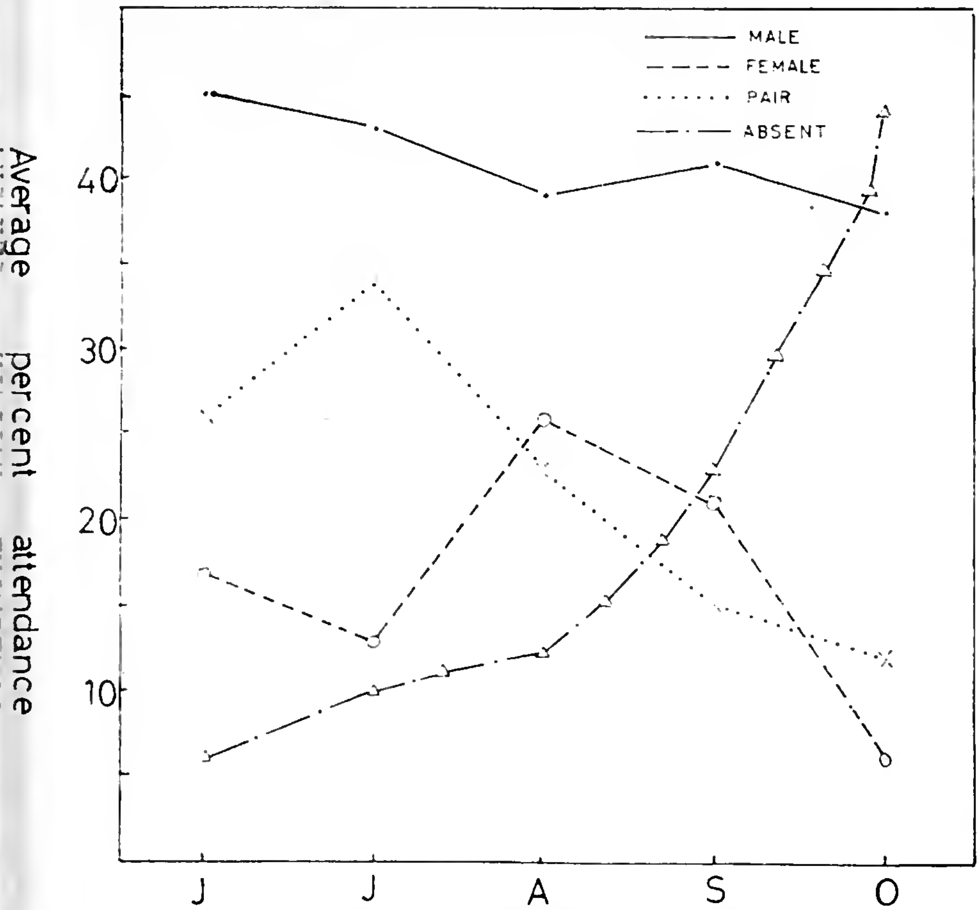


FIG. 9. Site attendance by failed breeders after egg loss, based on 781 observations (see caption to fig. 7)

clubs. The decrease in male attendance soon after pair formation may result from his tendency frequently to leave the female in attendance at this stage, perhaps to stabilise her site attachment as such, irrespective of the pair bond. In all four booby species mentioned earlier the males leave and return repeatedly, sometimes every few minutes, in the early stages of pair formation.

Failed breeders. Attendance in this category was calculated from the time of egg loss. Again the male shows a higher attendance than the female and is little affected by egg loss, his attendance comparing favourably with that of experienced males breeding successfully. The female's attachment, on the other hand, was lower following egg loss, suggesting that for her the site as such has a less strong attraction than it has for the male. Other independent lines of evidence have already suggested the same thing. Failed breeders spend longer at the site as a pair than do successful breeders, doubtless due to the demands of the chick on the latter.

Length of attendance spells

To investigate site attendance in more detail thrice daily checks were made throughout the season on one group of 20 nests and daily checks on a larger number. Table 5 summarises the attendance data for the more frequent checks on experienced birds.

Four main points emerged:

(1) The average duration of male attendance spells is greater than those of the female at all stages of the breeding cycle. This suggests a summation of site attachment with other factors (such as the attraction of mate, egg or chick), producing longer spells in males, which are known from evidence already given to have stronger site attachment. The longest continuous spell recorded was eight days.

(2) The average *number* of spells is the same for both sexes at all periods; it is the length which changes.

(3) There is a dramatic decrease in duration of attendance during the first half of the chick's growth, from 35.6 to 18.5 hours in the male and 30.2 to 18.8 in the female, showing the effect of chick feeding. However, during the second half of the fledging period the male's attendance spells rise to 23.7 hours, whereas the female's remain at 18.8. This difference could partly reflect factors responsible for certain other phenomenon associated with the site, such as rising aggression and increasing tendency to perform the site ownership display (see figs. 3 and 5).

(4) After the chick has fledged attendance spells rise significantly in males continuing the trend shown in the latter half of the fledging period, but rise less in females.

Table 5. Comparison between male and female Gannets *Sula bassana* of experienced pairs in duration and number of attendance spells throughout the season on the Bass Rock (639 spells for males, 637 spells for females, from 12 nests)

Period	No. of days	Average length of spells (hours)		Range of spells (hours)		Average number of spells	
		Male	Female	Male	Female	Male	Female
3 weeks before egg laying	21	44.6	39.6	4 to 197	2 to 134	6	7
Incubation period							
First half	22	37.2	30.8	7 to 84	4 to 70	8.5	8.3
Second half	22	33.2	29.1	6 to 62	10 to 46	9	9
Averages		35.6	30.2			8.7	8.4
Fledging period							
First half	45	18.5	18.8	4 to 58	7 to 50	31.2	30.6
Second half	45	23.7	18.8	5 to 103	3 to 70	25.9	26.1
Averages		21.6	18.8			27.9	27.9
3 weeks post-fledging	21	33.2	20.8	3 to 127	2 to 96	8.7	8.8

PAIR FORMATION AND RELATIONSHIP

Pair formation in the Gannet takes place only on the site and is preceded by male 'advertising' and female 'prospecting'.

Male advertising (fig. 10)

In many species the same display functions as male ownership display repelling rivals and male advertising to attract females. In the Gannet the two displays are distinct, though linked. Gannet advertising resembles inhibited bowing with the head shake component exaggerated, the wings closed and the dip reduced to a slight movement of

FIG. 10. (a) Male 'advertising' to female; the head is shaken from side to side and the wings are closed. (b) Advertising male in typical stance, slightly long-necked, bill inclined downwards, and resting somewhat back on tarsi; the female approaches with bill pointing upwards in a low intensity form of 'sky-pointing'

the head towards the female eliciting the response (fig. 10). The male does not even take a step towards her, though he makes slight reaching movements with extended neck.

It has proved useful in the analysis of displays to consider them produced by particular levels of arousal of fear, aggression or sex motivation. In particular, the occurrence of hostile displays directed towards females now seems hardly surprising in territorial species in which the species look alike. The similarity between aggressive bowing and the male advertising display may be interpreted along these lines, particularly when it is recalled that in advertising the aggressive component of bowing (the dip) is deeply inhibited, whilst the 'neutral' head shake is exaggerated (there is even some evidence that the head shake when incorporated into displays is 'friendly'). Thus the male's aggression is inhibited by sex motivation and in many cases the pair in fact copulate during their first meeting and always perform the friendly meeting ceremony (page 269).

The effect of male advertising was demonstrated quantitatively; such evidence for the function of signal behaviour in birds in general is still much needed. A natural choice situation is often presented to the female, who has the chance to respond either to an advertising male or a male, equally near, who is not advertising. In 74 cases in which females elicited advertising from fringe males 32% approached the advertising male rather than a passive male near-by, a further 41% displayed interest in the advertising male but did not approach and 27% ignored the advertising male. *None* approached a passive male. These figures show that male advertising has a real effect in attracting females.

Female prospecting

Female Gannets must perform the initial searching to obtain a mate since the male cannot (except fortuitously) contact her away from the site. Guillemots *Uria aalge*, Razorbills, Puffins *Fratercula arctica*,

Table 6. Known age of first breeding of Gannets *Sula bassana* on the Bass Rock

Age	Male	Female
4 years	1	–
5 years	3	3
5-6 years	1	4

Kittiwakes and terns, for example, all perform aerial flights together at some time before or during pair formation; Black-headed Gulls have special pairing territories (Tinbergen 1956); Shags may lead the female to the nest site after contacting her away from it (Snow 1963) and many passerines also do this. In the Gannet, territorially extremely aggressive, the male remains on the site and the female must come within range.

Male advertising is released mainly by young, unmated females who search or 'prospect' for unmated males. Like territory-seeking males prospecting females are mainly at least four to five years old (from plumage characters and more precise, though limited, evidence in table 6), though in new fringe pairs a significantly higher proportion of females than males show immature plumage. Prospecting females are not present at the colony in large numbers until April; in February and early March unmated (bereaved) males may wait more than two weeks before acquiring a new female, whereas later one male was known to be visited by several during a few hours.

Before landing in or near a breeding group they often fly over and probably land and take-off repeatedly before approaching a male. Like site-searching males they know the layout of a small area intimately as shown by the certainty with which they return to a site, once acquired, even in the absence of the male (the alternative, that females almost instantly 'imprint' on the area at pair formation, seems less probable). This ability is necessary in areas which forbid exploration on foot to correct a wrong landing. Prospecting females land anywhere, not necessarily near an advertising male, then peer around in a typical long-necked anxiety posture which often releases full advertising from nearby unmated males. However, the female's posture cannot be reliably distinguished by an observer from that of any anxious bird. The male's advertising is by no means exclusively directed to unmated females and it is doubtful, to say the least, whether males can distinguish mated from unmated females.

An advertising male stimulates the female to approach, which she does often hesitantly and with small-amplitude head shakes (a sign of conflicting emotions) before finally rushing up in the facing-away (appeasement) position (page 267). Sometimes she merely cranes forward and delicately touches his bill before gradually increasing this to the full meeting ceremony with no prior facing-away.

Table 7. The number of different male and female Gannets *Sula bassana* involved in new as against old nest-sites on the Bass Rock

M=male, F=female. Where old sites involved several males and/or females, the original pair had been disrupted

Status of site	Number of cases of nest-sites involving						
	1M, 1F	1M, 2F	1M, 3F	1M, 4F	2M, 1F	2M, 2F	2M, 3F
New	1	7	–	2	1	7	3
Old	45	5	3	1	3	4	3
	2M, 4F	2M, 5F	2M, 6F	3M, 1F	3M, 2F	3M, 3F	3M, 4F
New	3	2	–	1	3	3	5
Old	–	–	1	1	–	2	–
	3M, 5F	4M, 3F	4M, 5F	5M, 1F	5M, 2F		
New	–	1	1	–	1		
Old	1	–	–	1	–		

Two characteristics of prospecting females are particularly noticeable. First, they are initially ready to accept almost any male, so that should the site change hands (which new sites often do) the female is prepared to stay with the new male; one female began the meeting ceremony with a new male whilst her first mate was still at grips with a challenger! Their extreme responsiveness also facilitates pair formation, since males are usually strictly confined to their sites and have only an inconspicuous behaviour pattern to attract females. Initially, prospecting females show little preference for a particular male and may copulate with five in less than two hours. This promiscuous behaviour resembles that shown by club females. In the colony proper it has obvious disadvantages and leads to the formation of both kinds of triangular and multi-lateral associations (table 7). Also the female's tendency to break the first few pair-bonds she forms requires the male to continue advertising *after* he has obtained a mate. This again leads to severe female conflicts (out of 57 fights concerned with establishing new pairs, 31 were between females for the above reason). However, the advantages of female opportunism and high responsiveness must presumably favour these traits despite attendant disadvantages.

Second, prospecting females show astonishingly high tolerance of punishment from males and extreme reluctance to retaliate—characteristics which sometimes win acceptance from a hostile male. Clearly, the most aggressive males could only breed and perpetuate this trait to the extent that females were prepared to accept the results of such aggression. The two characteristics, male aggression and female

tolerance, must therefore have evolved in linkage. If male aggression is as important as we believe it to be, the extent to which females accept punishment is not surprising.

The female's approach is itself stimulated by sex interest, yet she is clearly afraid, even though the male does not usually threaten her. Her appeasement posture (facing-away) is strictly a response to an aggressive male and indicates some fear, as does the flurried, flinching nature of her behaviour in the meeting ceremony in which she may also face-away repeatedly. Occasionally females show slight aggression, though this is rarely detectable. Correspondingly, I could not recognise male fear in the new pair situation.

At this point it is appropriate to describe two behaviour patterns intimately connected with the pair bond and already mentioned in passing: female facing-away and the meeting ceremony (mutual fencing).

Female facing-away (fig. 11 and plate 43c)

The female reacts to male biting in the pair context by turning her head sideways and presenting her nape, at the same time pushing hard against him (fig. 11) or occasionally, and only as a reluctant alternative, by actual fleeing. Facing-away is a good example of appeasement behaviour in which the bill is turned away from the aggressor. It is interesting that the four possible ways of averting the bill all occur in the Gannet, but in different circumstances. Tucking it has already been mentioned as the pelican posture, pointing it vertically upwards will be described under sky-pointing, turning it to one side is facing-away, and withdrawing it completely occurs as withdrawal in menacing.

Facing-away is clearly fear-induced, as shown by its form (avoidance) and context (response to male attack), and was probably originally turning away prior to fleeing. Nevertheless, since it does not occur in

FIG. 11. (a) Female approaches male, is bitten and averts head. (b) Female then pushes close to male and 'faces away' in the appeasement posture which females show only to aggressive males

female-to-female fighting, sex motivation resulting from the pair situation may be involved, though a particularly high level of fear and low aggression may be sufficient to account for it.

Since its main function is presumably to reduce the intensity of male aggression (and possibly female retaliation) critical during pair formation, it should be emphasised that it is only effective when the male is not too strongly hostile. In new pairs facing away was followed by cessation of male attack in twelve out of 41 cases and failed to stop attack in the remainder. These figures cannot be compared with cases in which females did *not* face-away since these are so rare. Although a fair representation of the efficacy of facing-away, and a valuable demonstration of the functional value of a signal movement, the figures do not bring out the important point that facing-away functions most effectively in 'borderline' cases. It may be considered highly adaptive appeasement behaviour if it succeeds (as it does) in permitting pair formation in even a proportion of cases which would otherwise have failed.

It is possible to interpret male aggression towards a new mate as territorial behaviour elicited by the female as an intruder, but it becomes a matter for special remark that males *continue* to show aggression to their mates throughout their attachment (plate 43c). Some Gannets probably mate for life and others certainly for many years, yet in 98% of 294 cases incoming males bit their females and in 75% of 253 cases incoming females were gripped by the male. The difference is probably due to greater difficulty in biting in the latter situation. Among these hundreds of observations there was one record of a male being bitten by his mate, who had been startled by his arrival. Some writers have implied that the incoming bird bites the bird on the site, but the real distinction, as shown above, is one of sex—only males bite. Male biting in this context is severe enough to dislodge some head-feathers but does not result in observable wounds. I had the strong impression, though without measuring it, that biting was more prolonged and severe early and late in the season.

Females respond to incoming males by rapid head-shaking and facing-away before he lands—sometimes lying almost prone in the infantile beak-hiding position. Presentation of the nape does not prevent the male biting, but removes any risk of the female retaliating and releasing serious male aggression. It should be added that pair members clearly recognise each other; there is no question of females being treated as intruders until their response to biting proves them otherwise. The calling of an incoming bird evokes head shaking from the mate only, not from neighbours.

In 87% of cases in which males arrived with nest material in their beaks females did not face-away, whereas males without nest material failed to elicit facing away in only 10%, showing that this reaction is

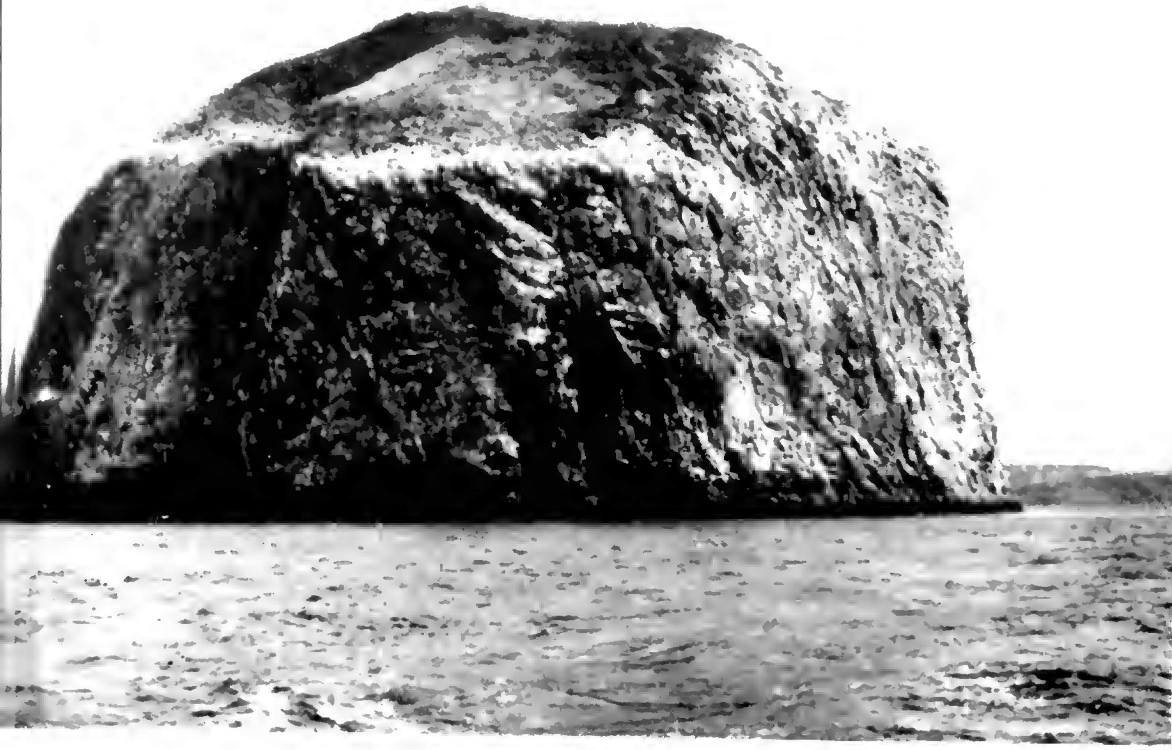


PLATE 41. Above, the Bass Rock, Firth of Forth, and some of its Gannets *Sula bassana*; the island is about a mile round and 340 feet high (page 233). Below, a disturbance among the Gannets on the left stimulates mutual fencing (the meeting ceremony of the pair) from three couples near-by (page 269) (*photos: J. B. Nelson*)

PLATE 42. Above, 'bowing', a common aggressive display of the Gannet *Sula bassana*, signals site ownership (page 247). Below, the 'rotary head-shake', which shakes and readjusts plumage, is induced by tactile stimuli or alarm (page 288)

PLATE 43 (*opposite*). Top, in copulation the male grips the female's head (page 279). Centre, mutual preening is frequent between the pair (page 278). Bottom, the arriving male bites his mate who 'faces away' (page 268) (*photos: J. B. Nelson*)

PLATE 44. Despite their aggressiveness, Gannets *Sula bassana* usually nest as densely as possible, therefore colonies show sharp boundaries and the nests are

spaced about two and a half feet apart. Here are cliff ledge sites on the right and a spread to flatter ground nearer the camera (page 23[illegible]) [illegible]

PLATE 45. Above, vigorous threat by Gannets *Sula bassana*; the defending and more aggressive male is in a forward posture, while his mate and the opposing male are withdrawn (page 245). Below, vigorous threat leads to real attack in which the opponent is driven away from the disputed site; note the method of fighting with extended neck and strong pushing movements (page 242). Left, a Gannet permanently blinded in one eye through fighting; fights may be extremely severe and serious damage of this kind is a not infrequent result (page 243) (*photos: J. B. Nelson*)

PLATE 46. Above, the 'pelican posture' of the Gannet *Sula bassana*; this is an ambivalent fear/aggression posture used in a wide range of situations (page 248). Below, high-intensity 'sky-pointing' in which the bird moves along with a swaying motion and displays its conspicuously lined feet (page 236) (*photos: J. B. Nelson*)

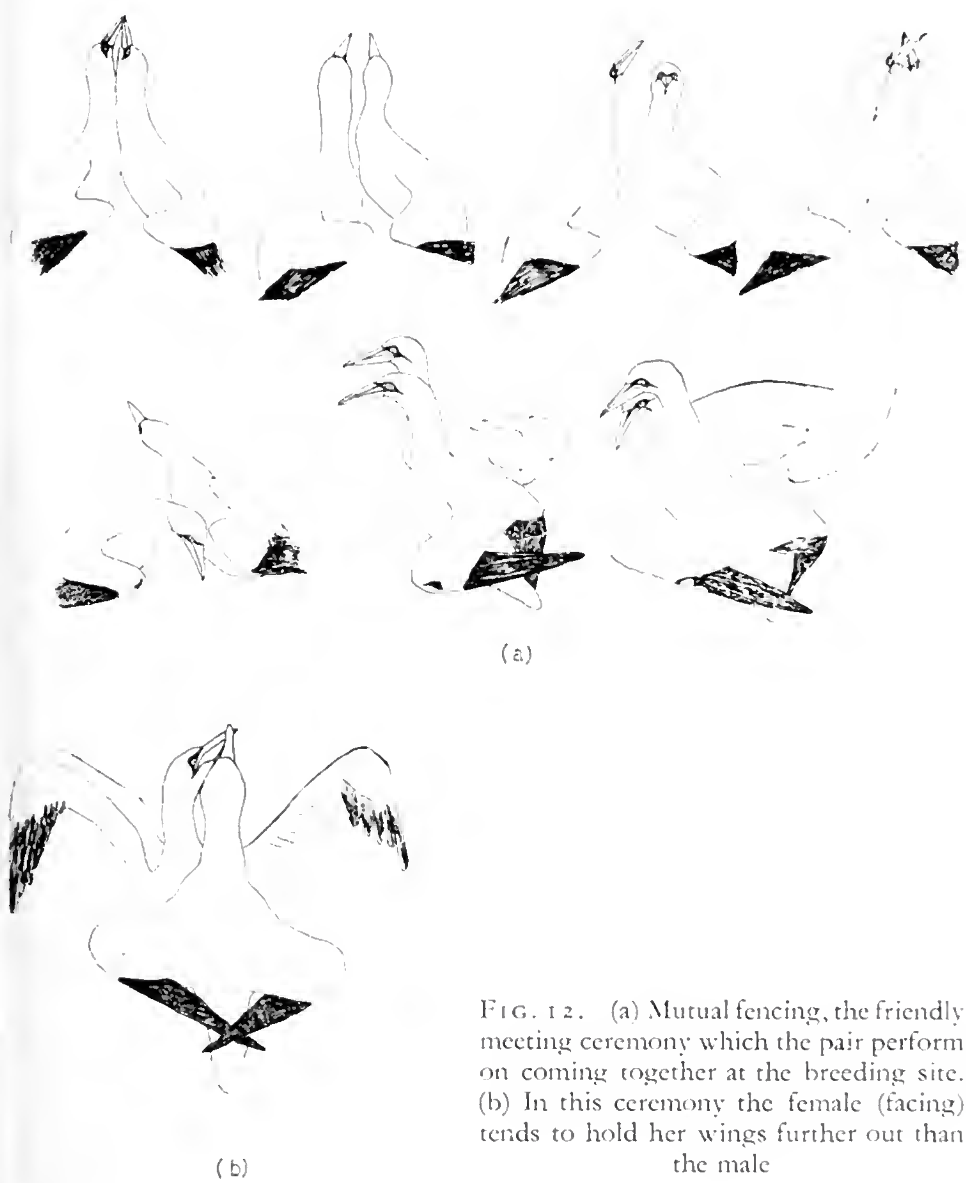
PLATE 47. Above, 'sky-pointing' by a Gannet *Sula bassana* moving to take off, the wings busked but not spread sideways: this bird is drawing a mild threat from one of its neighbours. Below, flight position which often follows sky-pointing; the bird now frequently utters a sepulchral groan (page 236) (*photos: J. B. Nelson*)

related not merely to the arrival of the male but to his arrival and biting capacity.

Females intruding on to a male's territory (as when two males independently acquire the same site and different females, one of which returns to the 'wrong' male or is there when he returns) are usually displaced (78% of cases) *despite* conspicuous facing-away and acceptance of male aggression. In this situation facing-away is relatively inaffective as an appeasement posture.

Mutual fencing (fig. 12 and plate 41b)

Mutual fencing between mates is one of the Gannet's most conspicuous behaviour patterns and seems to have been considered the 'main'



(a)

(b)

FIG. 12. (a) Mutual fencing, the friendly meeting ceremony which the pair perform on coming together at the breeding site. (b) In this ceremony the female (facing) tends to hold her wings further out than the male

display by other authors. It occurs most commonly as a meeting ceremony following the arrival of the partners at the nest, usually from flight, but sometimes on foot. It also regularly follows an aggression-evoking stimulus such as a menace from a neighbour, which would typically elicit bowing from a single bird.

Description. Whilst still many yards from the nest the in-flying bird of either sex calls stridently about four times per second, in response to which the mate head-shakes rapidly and, if a female, faces-away in anticipation of the bite to be delivered by the male.

As the male lands, perhaps even before, he shouts harshly and grips the female, sometimes so fiercely that an observer unfamiliar with Gannet breeding behaviour would certainly interpret the action as overt hostility intended to drive off an intruder. Following this the pair typically stand breast to breast and, with wings widely spread and bills inclined upwards, perform a rapid fencing or 'scissoring' movement with their bills, calling throughout—loudly when displaying vigorously and more softly as display dies down. This display and bowing are the main sources of the constant background of noise at a Gannet colony. Interspersed with bill-fencing are downward movements of the head, perhaps as far as the nest or only a little to one side, which often results in one bird reaching over the neck of the other in a sinuous 'neck-smoothing' movement. As a vigorous bout of mutual fencing dies down the wings are held closer to the body, heads more horizontal and head movements become slower and less extensive. In mutual fencing between birds new to each other the partners stand rather far apart, their movements are characteristically nervous and jerky, and the male intersperses slight biting of the female.

In form mutual fencing conspicuously resembles bowing, and will be considered as a modified form of it. The differences, however, are not merely imposed by the partners' positions (standing breast to breast). Whereas during the head shake in bowing the bill is usually held slightly below horizontal, in mutual fencing it is pointed upwards; this difference may be associated with the bird's greater aggression in bowing (see Andrew 1961 for a discussion of bill-position in relation to motivation). Mutual fencing contains fewer, more haphazard dips than bowing and the head shake is rather less regular, though this is possibly due to physical interference with each other's movements. In the female's mutual fencing during the pre-laying period this head shake frequently alternates with the soliciting head shake which precedes copulation.

Length and intensity of bouts. Mutual fencing between the pair continues throughout the season; the length of bouts varies, reflecting the vigour of the whole performance. Table 8 shows, for experienced pairs, the length of bouts resulting from meeting on the site at different periods in the breeding season.

Table 8. The average length (in seconds) of mutual fencing bouts in experienced Gannets *Sula bassana* on the Bass Rock at different times of the season (from thrice daily checks)

The figures in brackets represent the number of cases involved. 'Long absences' = 6+ hours. 'All absences' include those of unknown length

	March to mid April	Mid June to end July	September to mid October
Long absences	208 (30)	30 (38)	88 (11)
All absences	180 (35)	29 (56)	87 (13)

The differences are significant and show that mutual fencing bouts tend to be shorter in mid-season; it is only at the beginning or end of the season that even very short absences may be followed by long (two minutes or more) mutual fencing bouts. In fact, bouts become shorter soon after egg laying, and during part of the chick stage they may be very short (ten seconds). If a pair lose their egg, bouts suddenly become much longer again. This seasonal difference in bout length is also present in new pairs.

Other measures of the vigour of mutual fencing (roughly graded according to a composite intensity measure involving wing-position, amplitude, speed and inclination of head movements) showed the same seasonal pattern as the duration of bouts. The rise in mutual fencing towards the end of the season could be correlated with a rise in aggression, described earlier. It is obviously a 'non-personal' matter in the sense that recognition of each other by pair members will be at least as good at the end of the season as at other times.

Sex differences. There are sex differences in the form of mutual fencing. Males tend to dip more (table 9) and this difference is significant.

However, fewer dips are no indication that females mutual fence at a lower intensity than males (contrast their bowing), since in two other measures females mutual fence more vigorously than males (table 10) with wings held out more widely and greater persistence in maintaining the display. Also, their mutual fencing probably shows a higher

Table 9. Sex differences in the dip component of mutual fencing by Gannets *Sula bassana* on the Bass Rock

Out of a further 39 cases in which the actual number of dips were not counted, it was noted that the male dipped more than the female in 28, and the female more in 11

	Mean number of dips per bout	Range	Number of cases
Male	11.6	3-27	27
Female	4.6	0-21	27

Table 10. Sex differences in wing position and persistence in mutual fencing by Gannets *Sula bassana* on the Bass Rock

	New		Experienced	
	Male more	Female more	Male more	Female more
Extent to which wings held out	3	17	13	47
Persistence in maintaining mutual fencing	6	12	10	24

proportion of head shakes, though due to the variability in the movement I was unable to measure it satisfactorily.

Status differences. New pairs show longer mutual fencing bouts than experienced ones at the same time of year (table 11).

Thus one never sees new pairs re-united after a long absence perform the relatively perfunctory display occasionally seen in old pairs. It seems reasonable to suppose that as the pair get to know each other the mutual fencing bouts do not need to be as long. This, however, requires certain assumptions about motivation and function, which will now be discussed.

Motivation. Mutual fencing is restricted to male/female interactions, almost always between pair members. Aggression (male biting) and fear (female facing-away) are involved when the sexes meet and are particularly high in new pairs, and early and late in the season. These facts suggest that aggression and fear between partners have to be overcome; that they are reduced as the pair bond strengthens (i.e. in old pairs) and that they will be most difficult to overcome at the beginning and end of the season.

The seasonal and status differences in mutual fencing already described (bout lengths, vigour and so on) are all consistent with the above facts if it is assumed that the intensity of mutual fencing is correlated with the strength of aggression and fear between the pair. This is further confirmed by the fact that aggression-eliciting stimuli, such as

Table 11. Status differences in the length of mutual fencing bouts by Gannets *Sula bassana* on the Bass Rock

These records are mid-seasonal only and length of absence has not been taken into account

	Mean duration of bouts (seconds)	Range (seconds)	Number of cases
Established	45	5-150	31
New	97	10-180	9

threats at the pair, call forth renewed mutual fencing. It may also be illustrated by two examples:

(i) A male attacked his mate for 15 minutes and tried to drive her off the egg. The female faced-away most of the time, but also retaliated three times and almost drove the male away. After the third retaliation they began high intensity mutual fencing which lasted for 4 minutes 25 seconds. The new outlet for the aggression which both had previously shown completely prevented any further attack.

(ii) The male of a new pair returned, mutual fenced, copulated and was then menaced by a neighbour and turned on the female in violent re-directed attack. At the first pause this passed into intense mutual fencing lasting several minutes.

These show the aggression of the male prior to mutual fencing which then forms an outlet for the fear/aggression tension between the pair. The male's aggression in mutual fencing is further shown by his tendency to dip more than the female (the dip is probably an aggressively motivated movement, as in the bow).

Besides aggression (in the male) and fear (in the female), sex motivation is also involved. Early in the season, in at least 90% of cases, copulation follows mutual fencing. Also, the female mixes the ordinary head shaking with 'soliciting' head shaking.

Finally, since mutual fencing takes place only on the site this may be a necessary part of the external stimulus situation, though it is difficult to disentangle the effects of site and aggression.

Since the balance between fear and aggression will be different in male and female, it is reasonable to find that their mutual fencing also shows differences (e.g. in number of dips) and that these tend in the direction expected if the male is more aggressive than the female and if mutual fencing bears some quantitative relationship to the amount of aggression/fear to be overcome.

Mutual fencing in the Gannet is only part of the full meeting situation, which also includes male advertising leading to the *first* meeting of the pair. Male advertising, it may be recalled, resembles the ownership display with the aggressive elements reduced, though no male appeasement posture has been incorporated, nor does the male show any appeasing behaviour in his mutual fencing, as does the female. Considering the whole meeting situation in the Gannet, we find that advertising and mutual fencing are examples of pair formation displays derived from a relatively low intensity or 'more timid' (Tinbergen 1959) threat display (bowing) by more or less suppression of certain aggressive elements. Comparing the pair formation situation in the Black-headed Gull, we find that the coming together involves 'song' by the male (aggressively motivated), approach by the female, agonistic display by the male, appeasement (distance reducing) by the female and then *mutual* appeasement (head flagging) by both members. The

comparable sequence in the Gannet is advertising by the male (derived from mainly aggressive display), approach by the female in facing-away (appeasing) posture, aggression by the male, further appeasement by the female and a mutual meeting ceremony which, though it forms an outlet for aggression, does *not* include appeasement behaviour by the male. It is interesting that natural selection should not have eliminated the male Gannet's continued hostility to his mate—a fact doubtless related to the general aggression of the species, and particularly the male, as already stressed in other contexts.

Function. The discussion of motivation has already suggested that mutual fencing is a 'friendly' meeting or pair-bond strengthening ceremony, in which the aggression/fear between the sexes is reduced. For example, the longest bouts follow long absences and repeated short trips for nest material are followed only by perfunctory mutual fencing and by a much lower tendency for the male to bite; marked aggression by the male invariably causes the female to attempt mutual fencing as though to overcome the aggression; pairs which have already performed the ceremony do so again only in response to stimuli which elicit aggression.

The circumstantial evidence all points the same way: the more aggression there is to be allayed (and the means of ascertaining this are independent of the intensity of mutual fencing elicited), the more prolonged and intense are the mutual fencing bouts.

Summary. Females clearly elicit aggression when the sexes meet on the site; they are themselves afraid. Their initial appeasement behaviour is followed by a mutual display which expresses sexual attraction mixed with aggression in the male and fear in the female. Variations in form, intensity and seasonal incident, together with status differences, agree with the suggestion that mutual fencing reduces tension between members of a new pair, strengthens the pair bond and is the ownership display when both members are present.

Later stages in the pair relationship

At first the female is attracted only by the male, but soon after pair formation, and only then in the history of the pair, the male behaves in a way which apparently effectively extends the female's attachment to include the site; he leaves and returns repeatedly in a short period. In addition to gathering nest material, behaviour common to males of all categories, males of new pairs often move a few feet from the site and then suddenly rush back, bite the female and perform the meeting ceremony. In some situations short aerial excursions are made instead. A dyed male, conspicuous at long range, carried out nine such flights in less than half an hour. Repeated returning and mutual fencing probably both strengthen the pair bond and accustom the female to remain on the site when the male leaves. This is vital, of

course, to prevent site usurpation; it is precisely at this stage that most conflicts occur, due to triangular associations and so on.

After the first few prolonged male absences the female begins to take regular spells of attendance, which are necessary to safeguard nest material from thieving neighbours. Eggs are occasionally laid on bare earth but have a lower chance of survival. After the initial phase of interest centred solely on the male, the female thus acquires a strong attachment to the site, fighting, menacing and displaying in its defence. Nevertheless, all measures reveal that her attachment to it is weaker than that of the male.

The aggression shown by males during pair formation continues throughout the relationship (as late as September a male strongly attacked his mate, with whom he had nested in at least two years, for a full two minutes after her return from fishing). Pair relations will be affected by changes in motivation, some independent of the partner, others reflecting personal factors such as the state of the pair bond. Thus males of new pairs are more aggressive than those of old, but this aggression wanes. Within this framework they show a pattern of aggression which is stronger early and late in the season. Late season aggression cannot be due to males becoming less familiar with their mates and must be a 'non-personal' change, emphasising the extent to which many birds react automatically and directly to internal changes. One might have supposed that old pairs would have totally overcome violent aggression between themselves, or even developed 'affection'. Instead (whether or not the latter is true) males still respond to rising aggression by more severe attacks, even on their old and well-known mate.

The highly adaptive female tolerance of male aggression has already been mentioned as part of pair formation. Females were known to absorb male aggression for up to 20 minutes without retaliation. Later in the pair relationship females are not only bitten on meeting but are occasionally attacked by their mates, often as re-directed aggression stimulated by outbursts of activity in the neighbourhood. Their reaction, even under the most severe male attack, is merely to face-away, despite the fact that females can, on occasions, vanquish males (e.g. intruders). Even provoked retaliation is inhibited and they break off successful aggression to resume facing-away. This tolerance contrasts with the situation in many passerines, for example, the Chaffinch *Fringilla coelebs* and Greenfinch *Chloris chloris* in which, after pairing, the male will tolerate female aggression and she can supplant him at food (Hinde 1953). I do not know of any other example of comparable male aggression sustained throughout a life-long partnership as in the Gannet.

Females (and also chicks) are more likely to be attacked when slightly off the drum. One male alternated between two sites, each with a

female, and consistently attacked whichever happened to be off the site he was occupying whilst mutual fencing with the other. Thus he was attacking a female one minute and mutual fencing with her the next. This tendency may explain the female's initial hesitant approach to an advertising male, followed by a quick rush to get close, and then facing-away (fig. 11). Similarly the female is powerfully inhibited from attacking an intruding male if he can once gain access to her site, where she usually tolerates him. More unexpectedly, a female is more likely to attack an intruding male (or even menace her own mate) when she herself is off the site. This is probably due to the removal of the powerful inhibition against attacking a male which all females seem to experience when on the site.

Despite the permanence of the pair-bond and the strong reaction against intruders, partners remain remarkably receptive to strangers of the other sex. Whilst this allows both sexes to respond to a large number of suitors in the early stages and later also allows partner replacement, it also encourages triangular associations (see table 7). In almost all cases where eggs simply disappeared and all obvious possibilities could be discounted, at least one owner of the nest concerned was known to be 'interested' in a third party; the egg was therefore more likely to be left temporarily unattended. This egg loss and the many fights resulting from such associations are two obvious disadvantages of persistent receptiveness in both sexes. The system is probably adjusted to the Gannet's dense colonial nesting and the male's aggressiveness, both of which increase the likelihood of several abortive pairings before a stable bond is formed.

In the Gannet the receptiveness of one sex for the other is not entirely predictable and poses interesting questions about individual preferences. Males have a marked receptive period at the beginning of each season, become highly selective later and then go through a second receptive phase towards the end of the season, though within this framework there is much variability. After pair formation receptivity is substantially lower but may be retained, even in long-established birds, towards particular individuals with whom some previous relationship has existed and who are clearly still recognised. One male not only accepted back his previous mate after a year in which both had successfully bred with new mates, but also drove away his mate of one year's standing in favour of his original one. This case was the more outstanding since his original mate had been decisively beaten by the newer one. The male, notwithstanding, drove the latter violently from the site despite her prolonged facing-away and toleration of his attack. On the other hand, another male completely rejected his original mate after an estrangement of less than two months. In some cases relationship with two females turned on the outcome of the fight between them. Usually the loser did not return, but when she

did she was often forcibly ejected by the male. Again, however, in some cases the precise opposite occurred—the loser returned, was accepted and had to be ejected again by the victorious female. It appears that individual likes and dislikes play some part in determining the choice of a mate, just as in other higher vertebrates, though exactly what is the greater attraction of some individuals remains unknown (Snow 1963 correlated preference in the Shag with physical characters such as crest-size).

Where male or female are attached to two sites they show normal pair relationships with mates on both. Even when one site has an egg the other is also visited and intruders repelled. In one case where the two-site triangle involved one male and two females, each of which produced an egg, the male incubated both but favoured the first laid, even though not on the site where he had bred the two previous years. The newer female thus inevitably lost her egg. Even then the male continued to visit the site and repelled many site-establishing males with great determination. His dual site attachment caused at least ten fights in one season, though he eventually lost the site.

Site and mate attraction are clearly both strong forces and the striking variability in response to both seems to be the result of opportunism with its attendant advantages and disadvantages.

Many long-lived birds apparently breed together in several successive years and possibly for life. Where permanent site attachment exists, it is usually difficult to measure mate attachment independently of it. To use mate-fidelity as a blanket term which includes site fidelity can be misleading, though most authors do not distinguish between the two.

A figure for site/mate attachment can obviously be measured only for those years in which both partners are known to have survived. Table 12 gives the results of observations on 18 pairs for four years, 43 pairs for three years and 23 pairs for two years in terms of infidelity.

Thus over the four-year period eight males and 16 females left their mate and site of the previous year (irrespective of how many years after ringing). Males seem to have a stronger site/mate attachment than females. Looked at the other way round, out of four years in which both survived, 14 out of 18 (78%) of these pairs remained together the whole time, one out of 18 (5%) remained together only three years in succession and three out of 18 (17%) only two years. Equivalent figures for pairs known only three and two years are readily derived from table 12.

However, the difference between male and female has already been shown to exist in 'pure' site attachment (page 258). Can one further gain an idea of whether any of this site/mate figure is due to mate attraction or whether it may all be accounted for in terms of site attraction?

Table 12. Site/mate infidelity in Gannets *Sula bassana* on the Bass Rock

First year=year of ringing (in which no birds were unfaithful); second year=year after ringing; etc. Birds unfaithful in the fourth year, for example, had been together three successive years; unfaithful in the third year together two successive years; etc.

Years pair known to survive	Number of pairs	Faithful pairs	Unfaithful in second year		Unfaithful in third year		Unfaithful in fourth year	
			Male	Female	Male	Female	Male	Female
4	18	14	0	0	0	3	0	1
3	43	31	0	4	2	6	–	–
2	23	15	6	2	–	–	–	–
Total infidelities: male 8, female 16								

The 16 cases of female infidelity arose from a possible total of 163 'chances' to be unfaithful $[(3\times18)+(2\times43)+(1\times23)=163]$ in the year(s) following ringing. Their actual score is therefore 10% and their site/mate fidelity 90%. Similarly, males were unfaithful in 5% of the possible 'chances', giving site/mate fidelity of 95%.

The only figure for 'pure' site attachment in the female is ten out of 13 (77%) of cases in which she returned to the site even though the male had disappeared during the winter. The difference between the 90% site/mate figure and the 77% site attachment may represent the additional effect of the mate.

The male's 'pure' site attachment may be reckoned as all cases in which he returned to the site (not merely those in which the female died or disappeared) since the male returns first in any case. This figure is 94% compared with the site/mate figure of 96%. Alternatively 15 out of 16 (94%) males losing their mates stayed on their old sites.

It therefore seems that site attachment is very strong in both male and female; and that mate attraction plays an additional part in the case of the female, but not in the male. This fits with the rôle of the male as the site-establishing sex and the female as responsive to the attraction (advertising display) of the male.

Mutual (allo-) preening. Members of a pair often follow mutual fencing or copulation by mutual preening (plate 43b) in which each delicately nibbles, with the tips of the mandibles, the head, throat and neck feathers (occasionally the wings and back) of its partner. The eyes are often closed, but probably not as a protective measure. The head is heavily infested with *Mallophaga*, but mutual preening does not appear to remove them and may perhaps persist because of its association with pleasurable tactile stimulation; Goodwin (1956), on the other hand, believed that caressing in Woodpigeons is effective in removing

ectoparasites. It is infrequent when compared with ordinary preening, occurring mainly in established pairs. It may possibly be appeasement behaviour, though it usually occurs after mutual fencing has removed tension between the participants, often after long quiet periods; however, its connection with aggression is clearly indicated in unstable pairs when it may alternate, in the male, with overt hostility. Once an intruding male preened the female and then showed intention movements of copulation. Copulation in this situation is often aggressive and, as mounting approached, his preening became rougher and finally graded into biting prior to copulation. The reverse also happened—a male starting with attack often ended by preening. However, this may be in part an expression of postural facilitation, the biting grading into nibbling and preening due to the bill being brought into the 'correct' position. Similarly, adults often alternate attack on strange chicks with preening of them. In the Red-footed Booby there is no mutual preening and it is interesting that this species also lacks a ritualised meeting ceremony equivalent to mutual fencing in the Gannet. It may well be that lacking the means of turning into harmless channels the aggression engendered by close proximity and the pointing of beaks at one another (inherent in mutual preening) the Red-foot accordingly lacks this behaviour pattern.

There is a tendency for females to preen males more frequently than vice versa, as in Jackdaws *Corvus monedula* (Lorenz 1931) and many other birds (Harrison 1965), though Cramp (1958) reported caressing in Woodpigeons with no obvious excess by females, despite Goodwin's earlier remark (1956) that in the early stages of pair formation females do seem to do more.

Following the chronological sequence of the breeding cycle, the next topics are copulation, nest building, egg laying and incubation.

Copulation (plate 43a)

Copulation occurs only at the nest site and is usually solicited by the squatting female with violent and rapid sideways head shakes, which sometimes become vigorous flinging movements of such amplitude that the bill tip points over the back to the tail. These continue to some extent during copulation. Before mounting, usually from the side, the male points his bill towards the female's head, head shakes lightly, patters his feet and grips the female's head strongly. Copulation takes 15 to 35 seconds (average 24 seconds, 180 measured) from placing one foot on the female's back to dismounting. During copulation the female head-shakes repeatedly and occasionally arranges nest material. The male waves his outspread wings and patters noisily with his feet, which move singly or in unison—in the latter case he rests on his tarsi. This must be a powerful tactile stimulus to the female and

perhaps helps to synchronise the act. The toti-palmate foot is surprisingly prehensile and by clenching the toes the claws effectively grip the female's plumage. Cloacal contact follows tail raising by the female. The female's cloaca dilates and contracts, whilst the male's everts to facilitate intromission (this was clearly seen on two occasions). Upon contact, and presumably ejaculation, the male closes his wings and remains immobile for several seconds, afterwards shaking the female's head strongly. The occurrence of these latter stages were my criteria for deciding whether copulation had been successful. Insemination can probably be reliably detected, since abortive efforts do not produce the cloacal contact and final immobile stage characteristic of complete sequences. After copulation the male may let go of the female, sky-point four or five times before dismounting, fly straight from her back or simply step down.

Copulation behaviour varies considerably. Intruding males or males of new pairs may bite the female so fiercely that she shows fear and prevents cloacal contact by lowering her tail. However, judging by the aggression normally present, and the way in which even hostile males are often successful, male copulatory behaviour and aggression (and female copulatory behaviour and fear) are less incompatible than in other species, where hostility must be eliminated before copulation can occur. This again illustrates the incorporation of aggression in to the normal pair relationship and the development of female tolerance to it.

Out of many hundreds of copulations only one reverse copulation was seen, although they are much commoner in the Phalacrocoracidae —*cf.* Shags (Dr. J. M. Cullen pers. comm.) and Cormorants (Kortlandt 1942).

Copulation (male rôle) with chicks is not uncommon. Between 8th August and 19th September 1961 and 1962 twelve cases were recorded for males, in two of which the female was also present, so that this behaviour occurs even in the presence of the normal releasing stimuli. In nine cases the chicks were ten to eleven weeks old and the youngest was six weeks. The age of the chicks suggests that it may be necessary for them to approximate to adult size and shape. The females did not interfere.

Although reverse adult copulations were so rare, I recorded twelve cases of females copulating with chicks between 9th August and 19th September 1962 and 1962; in eleven cases it involved chicks from nine to eleven weeks, the youngest being eight weeks. The male was present on one occasion and did not interfere. Females gripped chicks in the male's usual manner and in three cases copulation passed into preening of the chick's head.

Copulations occur over a period of some seven months (earliest and latest dates 10th March and 28th September), corresponding with the

unusually prolonged period of site attendance and social behaviour. In any one pair the period is usually about four to six weeks before egg laying, with a small late-season resurgence. In addition to this extensive period when copulations are frequent, there is a high individual rate (probably a 100 or more per pair in the period before egg laying). The individual frequency during short periods (highest rate four copulations in 40 minutes) seems not unduly high for sea-birds, though quantitative comparative evidence is lacking. I have seen Herring Gulls achieve seven cloacal contacts in three minutes, but without dismounting. Dr. Cullen (pers. comm.) found that Shags mount at about the rate of nine to twelve times a day for a period about three weeks before egg laying. This figure includes unsuccessful attempts whereas these are rare in the Gannet. Fig. 13 shows the

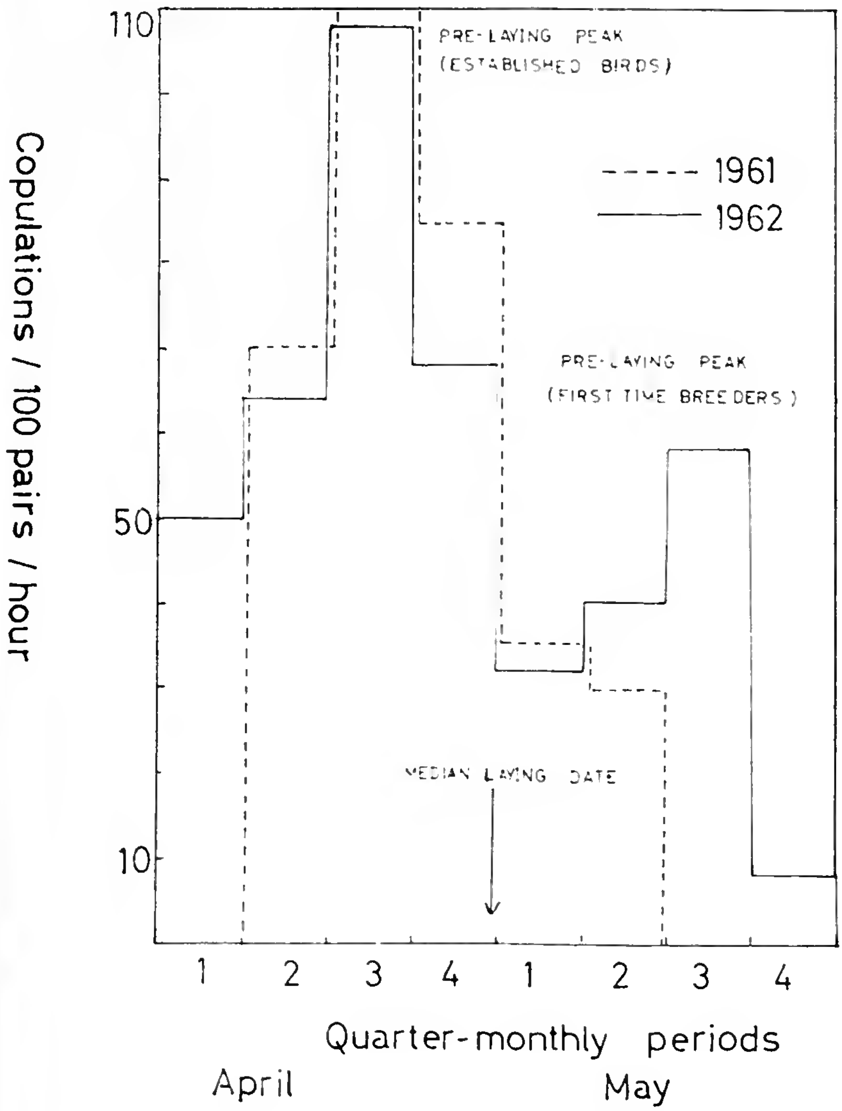


FIG. 13. Seasonal frequency of copulations

changes in copulation rate within the observation colony in April and part of May. The peak in the third week of April reflects the immediate pre-egg laying period (mean) for the colony. After laying (mainly spread over about a month) copulations virtually stop for the pair concerned, probably due to an inhibitory stimulus provided by the egg (see below).

The sharp drop in copulation rate after egg laying is very striking, particularly since copulation reaches a peak some ten to 14 days before laying. An isolated instance, in which a female in a triangular situation laid an egg to one male but allowed copulation with the other 13 days afterwards, suggests that the male may be the inhibited sex. Occasionally males returning to the nest soon after the egg had been laid made copulation intention movements but actual mounting did not occur, although (from other records) it would have done had the egg been absent.

Though re-laying can occur six days after loss if the first egg was never incubated, lost eggs are usually replaced in about a fortnight (Nelson 1964a). This about corresponds with a peak in copulation ten to 14 days before the main laying period if females are particularly prone to stimulate copulation at the time when fertilisation can occur (i.e. at ovulation). Copulations restart *within 24 hours* of egg loss irrespective of the degree of incubation achieved (e.g. in one case 32 days after laying). This was a regular and remarkable phenomenon, indicating that the egg as an external stimulus was responsible for the abrupt cessation of copulation after laying, not the onset of gonad collapse making secretion of spermatozoa impossible even after some time (although it is possible that apparently successful copulation could occur even though there had been gonad regression). The suddenness of the change does not rule out the possibility of hormonal mechanisms being involved. Lehrman (1959) mentioned the possibility of external stimuli reflexly causing changes in hormonal secretion.

All changes in the reproductive systems of birds result from the interaction of environment, gonads and central nervous system. The factors inducing breeding condition may well have received more attention than the regressive phase. Marshall (1959) stated that the post-nuptial stage involves a regenerative phase (sexual quiescence) during which the testis does not produce spermatozoa and there is no sexual behaviour. In the Gannet it may be the necessity for a prolonged period of site attachment and aggressive display (both of which presumably require a relatively high androgen level) which keeps the gonads active for a much longer period than in short-cycled species, and reduces the period of the regenerative phase. It would be interesting to compare other long-cycled species with respect to seasonal extent of copulation and also sexual and aggressively motivated displays.

Table 13. Seasonal variation in copulation success among Gannets *Sula bassana* on the Bass Rock

The figures for 'unsuccessful' copulations will be minimum, since a proportion of apparently successful copulations may well be unsuccessful

Period	Number of pairs involved	Percentage unsuccessful
March	49	22%
April-May	55	12%
June-July	87	67%
August-September	29	67%

Later in the season, when the chick is well-grown or fledged, copulations begin again, though they never reach the pre-laying peak. They are often successful (by the criteria mentioned) and do not differ in any noticeable way from early ones, except that the female never showed the intense soliciting behaviour found before egg laying.

There is seasonal variation in copulation success, which is highest at the functionally optimal time, i.e. some time before egg laying (table 13).

Copulation commonly occurs within ten minutes of the pair coming together on the site after an absence of more than a few (up to three) hours. It almost invariably follows mutual fencing in the pre-laying stage. The copulation soliciting behaviour of the female is extremely stimulating to the male and almost 'forces' him to mount even if he is aggressive. One cannot be certain that the male has not first shown copulation intention movements and hence elicited the soliciting head shake though this seems unlikely in view of his aggression. The female Gannet seems so conditioned to male aggression that she responds to it as a 'usual' part of the pair relationship and particularly in the pre-copulation situation. This raises the interesting point of how far the male's hostility to the female is 'pure' aggression and how far it is sexual behaviour, stimulating to the female and selectively encouraged accordingly. Whilst in many situations the male is undoubtedly aggressive and indeed sometimes drives the female away it seems likely that in the later pair relationships, particularly in copulation, the biting will have acquired a sexually stimulating function thus allowing aggressive males to benefit both territorially and in the sexual part of reproduction.

After the male dismounts the female often touches nest material and makes nest building movements (this happened in 60% of all cases in which behaviour was recorded up to ten seconds after the male dismounted, while the male touched nest material in 20%). On the other hand, males sky-point more often (35% in the same sample, females [illegible]%). Nest touching may be partly due to postural facilitation; the female sitting in the nest cup is in the normal position for arranging nest material. Male sky-pointing is correlated with his tendency to

leave the site for nest material soon after copulation. This movement away from the site is the context in which sky-pointing normally occurs (to be discussed in part 2). Post-copulation trips to gather nest-material vary from a few inches to over a mile. Mutual fencing follows copulation in about 40% of cases.

Female facing-away follows aggressive copulation in some cases and the male (rarely the female) often assumes the pelican posture which is probably an ambivalent agonistic posture (to be discussed in part 2). Thus even in the 'purest' sexual activity there are clear signs of the complicating tendencies which are such a feature of pair-formation displays prior to copulation.

Nest building and associated activity

Gannets accumulate large, compacted nests of sea-weed, grass, moulted feathers and flotsam and add to it any earth they can reach around the nest. The drum or pedestal occasionally measures up to six feet from rim to base, the product of many annual increments, though in most cases a well-established nest is about one to two feet high with a firm, shallow cup lined with grass or sometimes sea-weed, and often containing feathers. The finer material in the cup results from removal of larger items rather than a deliberate choice of fine material, much as in Shags (Snow 1960). However, there is enormous variation not only in the size but also in the quality of the nest. Some females lay and incubate on large, well-lined nests, others on a patch of muddy ground with a few scraps of material. The sides of the pedestal are heightened by a continuous 'gardening', the birds reaching down and drawing loose earth and debris up the slope to the rim. This elevation can be highly adaptive under adverse conditions. Low-lying nests on flattish ground tend to gather drainage water during heavy rain and the young become soaked and chilled. I have seven records of young from such nests, too old to be effectively brooded but still protected only by their down, dying during cold north-east winds and rain in June and July. In addition, high nests provide take-off points—useful in flat areas, since nesting Gannets do not allow free passage to birds departing on foot.

Although nests are not systematically added to by the bird's own excrement, which is usually voided well clear by both adults and well-grown young, adults sometimes lower their tails and excrete onto the side of the nest. It is usually the more viscous residue from the alimentary tract which is 'directed' in this way, the liquid faeces being squirted clear. On small, sloping ledges where nest material sticks with difficulty, the cementing action of excreta is unquestionably valuable in providing a base for subsequent accretions. Indeed, were it not for this and the use of earth and humus (often pulled up with grass) nests would never stick onto some of the sites used—a measure of

the potential value of this habit to the species. Shag nests, which lack this 'cement', could not accumulate on some sites used by Gannets, whose adaptability compared with some cliff-nesters is worth special mention and could be significant in permitting extension of range. Cullen and Ashmole (1963) have suggested that the Black Noddy *Anous tenuirostris*, because of its ability to attach nests with excreta, can utilise nesting sites denied to its relative the Brown Noddy *A. stolidus*, and the Kittiwake has an even greater ability to stick nests on small projections. However, quite apart from ability to stick nests, the Gannet could never use certain kinds of sites open to the agile Kittiwake, and its choice may often be limited by its manoeuvrability.

Bringing nest material. Gannets collect nest material (273 records of grass and 131 of sea-weed in 1961 and 1962, with more grass than sea-weed in both years) from January to the beginning of October, and indeed may be seen carrying sea-weed in every month of the year, though mainly from the end of February to October. Stealing is common throughout the season and reaction to the sight of nest material is so strong that birds sometimes try to rob each other both when gathering it and also in mid-air.

One hundred and two five-minute counts of the frequency with which nest material was brought to a group of 250 nests showed that this rose steadily in April (averaging two, two, three and four per five-minute period in the four quarters), was lower in mid-season and rose again in August.

The rise before egg-laying is associated with the increased rate of copulation, since this is usually followed by nest material gathering. Some days before egg laying females spend longer on the nest with the male, thereby facilitating copulation and the attendant nest material gathering—a chain of events producing a well-built nest just prior to laying. Before laying, nest material is brought by the male only (231 visits by males recorded, none by females), but subsequently, though less frequently, by the female also. Males, but rarely females, bring nest material to their sites even in the absence of a mate to guard it between collecting trips.

For the remainder of the year gathering is scattered, although sudden rain elicits a marked outburst of nest building. In five minutes during rainy weather in August 1962, for example, 28 birds arrived with nest material at the group of 250 nests, only about 40 of which were attended by pairs. Since Gannets do not normally leave their nests unattended, three-quarters of the possible total were gathering nest material at the time of the count. This activity continued for hours—a spectacular response (Kittiwakes react to a similar extent. E. Cullen 1957). The function in the Gannet may be to elevate the nest and keep the egg or chick drier, though even pairs without egg or chick respond in this way.

Nest-building movements. Gannets spend much time arranging nest material throughout the season. They have no complicated method of interweaving the material, merely placing it in front or to one side whilst standing or sitting and, with rhythmic, small-amplitude, sideways head movements and trembling of the mandibles, pushing it into place. In the early stages of nest-building, even on bare earth or rock, material is deposited precisely on the site and perhaps handled briefly. By turning on the site, the Gannet forms a cup and later additions are built in vigorously and for prolonged periods. Stimuli from the cup probably intensify nest-building. I noticed that after shifting the egg and settling to another spell of incubation they seemed particularly prone to arrange nest material around their breast and flanks, tucking small pieces delicately between themselves and the nest, perhaps to 'seal' in part of the warmth. After depositing and arranging the material in this way, the mandibles are characteristically opened and vibrated to dislodge any material sticking to them, followed by a quick sideways head shake, varying in vigour with the stickiness of the material. Sometimes material is placed in position without any sideways building movements. Mandible vibration is not strictly confined to the context of nest material handling; it also occurs when dealing with regurgitated fish and sometimes in high intensity conflict situations.

Nest maintenance involves 'nest digging', in which the mandibles, slightly parted, are thrust into the floor of the nest and used as a probe to dislodge hard lumps. Digging is performed with concentration and vigour, and seems to become more frequent during the hatching and tiny chick periods, when it may be adaptive in removing sharp objects which could injure the egg or chick. Snow (1963) recorded it in the Shag and suggested it might 'sift' ectoparasites out of the floor of the nest, but its form in the Gannet suggests it would be inefficient for this purpose.

Adults and well-grown young sometimes toss or juggle pieces of stick and other objects, apparently playing with them. The quick, jerky head movements and dexterous manipulation of the object resembles the way in which fish-eating birds orientate their prey before swallowing it. It could help chicks to perfect movements which will later be used in dealing with prey. Unemployed birds in the fringe juggle much more frequently than breeders.

Whereas the nest-building movements already discussed play some part in maintaining nest structure, there are two distinct forms of non-functional nest-touching.

Ordinary nest-touching movements. These occur in a variety of conflict situations, in which nest material may be handled and put into place, handled aimlessly or merely touched. Thus, nest-touching movements often occur in severe menacing bouts and other high-intensity agonistic

situations in which the bird performing it (or performing it most) is slightly inferior or under stress. However, the winner of a severe fight, who is then aggressive, usually mixes nest-touching with bowing and an aggressive male trying to repel a female frequently touches nest material. It also occurs in the male during female-to-female fights on his site.

Nest-touching commonly follows menacing, but less often in pairs than singles; pairs usually follow menacing by mutual fencing.

Nest-touching also occurs in the female after copulation (60% of cases), during mutual fencing, particularly in the female, and, on occasions, in bowing. In some other species, such as the Wood-pigeon (Goodwin 1956) an aggressive display (here 'nodding') is thought to be derived from nest-touching.

Aggressive nest-biting. Immediately after alighting on their empty nest or site, Gannets, particularly males, bite the nest material, ground or even bare rock, at the same time calling aggressively. Of 91 such landings, 29% were followed by full aggressive nest-biting and a further 64% either by touching nest material or bowing (itself derived from nest-touching, probably of the aggressive kind). Frightened birds, after alighting, showed less tendency to touch nest material or bow. In early February 1962, when occasional 'panics' still occurred, 19 out of 27 birds showed an anxiety posture as the first behaviour following landing, only three touched nest material and none bowed. Birds landing *away* from their sites and birds without sites landing in the fringe never showed aggressive nest-touching movements.

Apart from landing, an agitated and conspicuous form of aggressive nest-biting occurs when birds return on foot to their sites after some disturbance in the colony (e.g. landing off-site and being attacked, knocked off by a fight near-by, and so on) and also during aggressive (but non-fighting) encounters, and following fights.

Motivation of nest-touching movements and nest-biting. Nest-touching movements which do not result in nest-building, and therefore appear 'irrelevant', result from fear, aggression and mating conflict situations. Since, in the Gannet, they occur only on the site this may also play a part in the motivation, although site and aggression are so closely linked that it might not be possible to separate their effects. Tinbergen's (1952) definition of displacement activity includes the idea that it arises when 'an activated drive is denied discharge through its own consumatory act(s)'. Irrelevant nest-touching movements would seem, in many instances, to fit with this.

From the viewpoint of causation it may be asked why nest-touching, rather than anything else, should be the irrelevant behaviour performed in the situations described. Possibly because nest material is an effective directing stimulus in these circumstances. If the conflict occurred at sea, for example, bathing could become the irrelevant

action; in fact, fights ending on the sea are invariably followed by excited bathing in both participants, as in many water birds. On this supposition, preening, rotary head shaking, scratching and other comparable actions could all be considered as 'likely' as nest-touching, but may have been excluded because, for example, they would reduce the bird's ability to defend itself in precisely those situations requiring vigilance against attack.

If irrelevant nest-touching is the result of nest material 'directing' the behaviour resulting from conflicting tendencies, possibly of different kinds under different circumstances, rather than the result of a specific kind of conflict situation, one would expect (as one finds) that it is elicited by a variety of conflict situations. Aggressive nest-biting may contain an element of redirected attack, as may the male's habit of biting the female, since incoming birds are often menaced by neighbours.

(*To be concluded in the August issue, when plates* 42, 46 *and* 47 *will also be discussed more fully*)

A mixed population of redpolls in northern Norway

By M. P. Harris, F. I. Norman and R. H. S. McColl

INTRODUCTION

The redpolls of northern Norway have for many years been the subject of much discussion concerning the species and subspecies involved and also the taxonomic status of the subspecies themselves. The species and subspecies thought to occur in this region are *Carduelis flammea flammea*, *Carduelis flammea holboellii* and *Carduelis hornemanni exilipes*. However, doubt has been cast on the validity of *C.f. holboellii* (Kinnear *et al.* 1948).

Salomonsen and Gitz-Johansen (1950) considered that there was a latitudinal zonation with *hornemanni* as the high arctic equivalent of *flammea*. Lundevall (1952), however, suggested an altitudinal difference with *hornemanni* on the tundra and *flammea* down below. Watson (1957) believed that there was no evidence to support Lundevall and, indeed, Swanberg (1951) found both forms on the tundra. Payn (1947), discussing two skins from northern Norway, suggested that the populations could not be separated taxonomically into the groups mentioned and thought that a hybrid swarm might be present, for which he used the name *Carduelis hornemanni pallescens*. Williamson (1961), reviewing the evidence, reached the same conclusion.

Attempts were therefore made to trap redpolls in the county of Finnmark during the University College of Swansea Øksfjord Expeditions in 1961 and 1963. We should like to thank all members of these expeditions, especially R. Price who took part in the trapping in 1961.

In both years redpolls were thinly distributed over many of the areas visited, and flocks were found on the island of Loppa (70°21'N, 21°25'E) and at Øksfjord (70°04'N, 21°25'E) in 1961. That year 88 redpolls were caught and ringed on Loppa between 25th and 27th August from a flock of about 400, and 79 at Øksfjord on 5th and 6th September from a smaller flock. In 1963 exactly 70 were ringed on Loppa between 24th July and 15th August. Most of those ringed in 1961 were caught at roost in birch scrub and some were taken too late in the day for detailed descriptions to be made, hence the varying totals in the summaries given below.

The plumages of the species and subspecies under discussion are given in *The Handbook* (Witherby *et al.* 1940) and so need only be summarised briefly here. *C.f. flammea* has scarcely any buff on the rump, though occasionally there are a very few dark streaks; the flanks are greyish-white, streaked dark-brown, again with scarcely any buff. *C.f. holboellii,* which may be considered a subspecies or form of *flammea,* has a larger bill. The main difference between *C.f. flammea* and *C.h. exilipes* lies in the rump colour, *exilipes* having a purer white rump with no streaks; the flanks are lightly streaked. In view of the importance of rump and flank colour, particular attention was paid to these characters.

RESULTS

Plumage details

In 1961 the majority of the redpolls examined had completed their body moult, although ten of the adults were still moulting their outermost primaries, whereas in 1963 moult was only just beginning. Redpolls in worn plumage appear more streaked than those in fresh plumage, owing to the lighter edges of the feathers having worn away. The plumage details which follow therefore refer mainly to those caught in 1961.

The birds handled varied from typical *flammea* to almost typical *exilipes,* it being virtually impossible to assign a specific or subspecific name to any individual even when compared with typical specimens of the same age and sex.

The rumps of the adult males were mainly white (22 birds), with streaking which varied from slight to very heavy, but one male had a completely white rump. In four males the rump was basically grey, again streaked. In 1963, before the moult, a higher proportion had grey rumps (four out of twelve). One female had a completely white

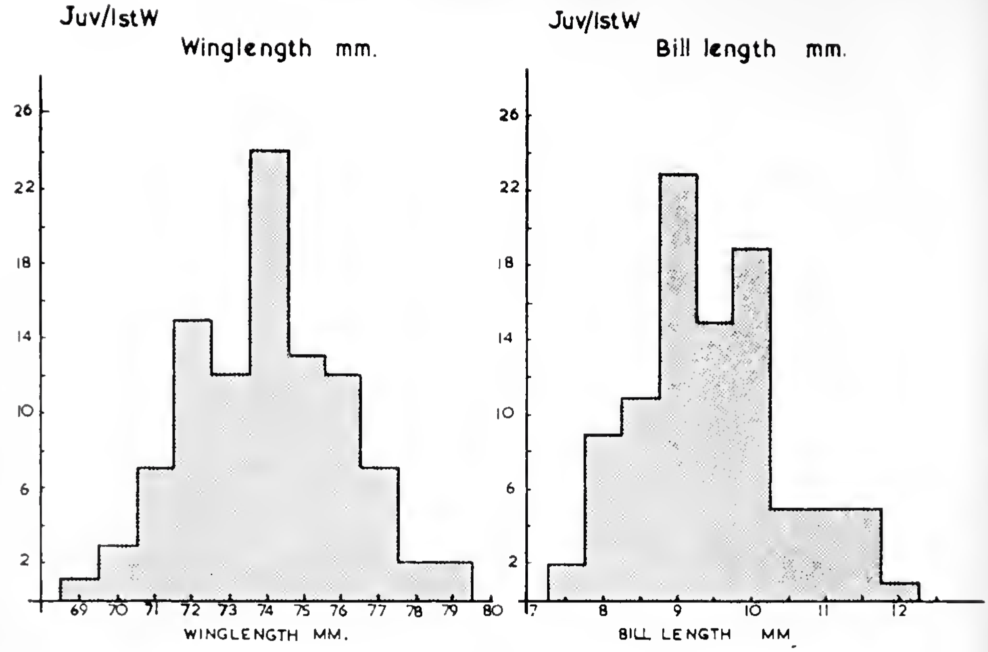


FIG. 1. The distributions of wing lengths and bill lengths of juvenile and first-winter redpolls *Carduelis flammea/hornemanni* in Finnmark, Norway, July-September 1961 and 1963

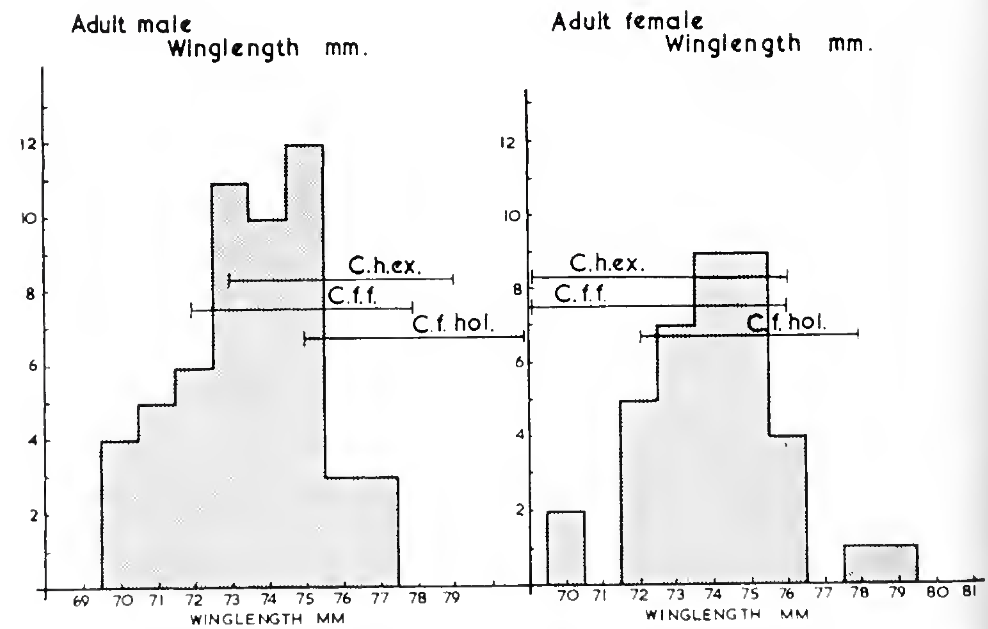


FIG. 2. The distribution of wing lengths of adult male and female redpolls *Carduelis flammea/hornemanni* in Finnmark, Norway, July-September 1961 and 1963, showing the ranges of corresponding measurements in *Carduelis flammea flammea*, *C.f. holboellii* and *C. hornemanni exilipes* given by Junge (1952) and Witherby *et al.* (1940)

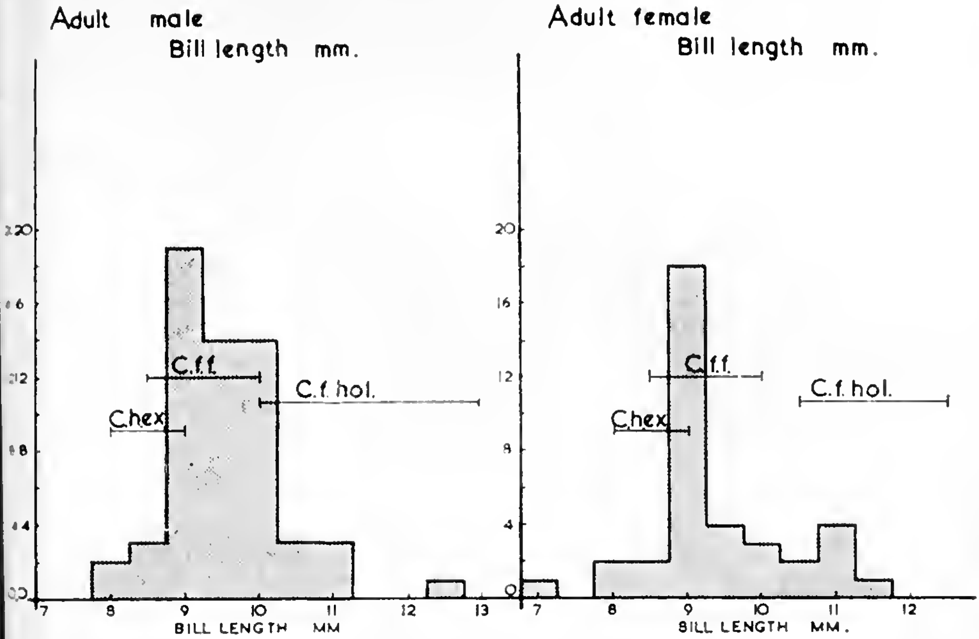


FIG. 3. The distribution of bill lengths of adult male and female redpolls *Carduelis flammea/hornemanni* in Finnmark, Norway, July-September 1961 and 1963, showing the ranges of corresponding measurements in *Carduelis flammea flammea*, *C. f. holboellii* and *C. hornemanni exilipes* given by Junge (1952) and Witherby *et al.* (1940).

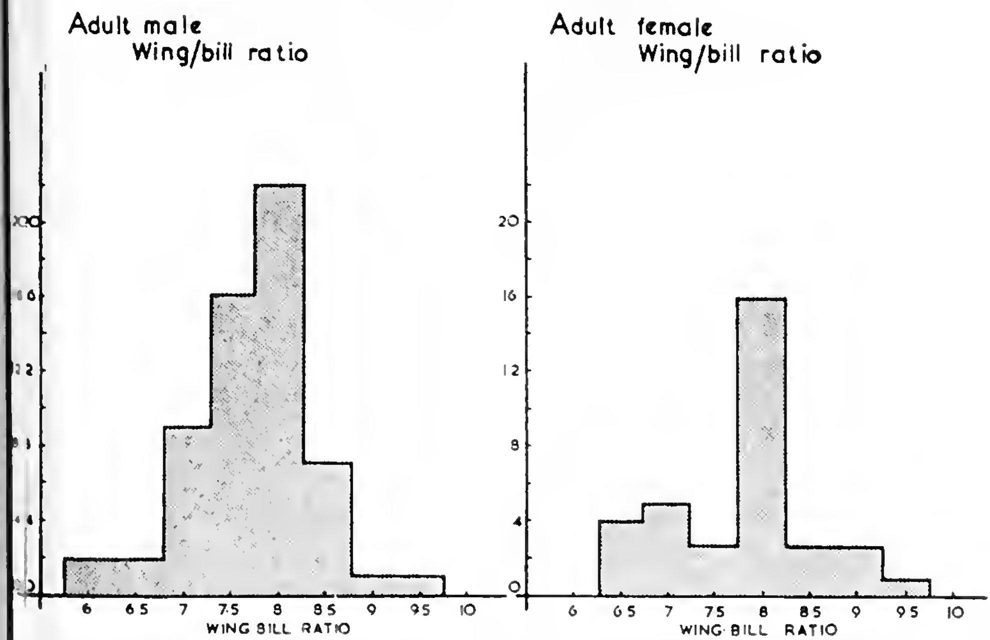


FIG. 4. The distribution of wing to bill ratios of adult male and female redpolls *Carduelis flammea/hornemanni* in Finnmark, Norway, July-September 1961 and 1963

rump, while the remainder were divided between streaked white and streaked grey, with more of the latter. Before moulting, the rump colour was mainly grey. In many males, the rump was tinged an orange-red. *It was very noticeable that the appearance of the rump in the field gave no indication of the real colour as seen in the hand.*

Flank colour showed much variation. Of the 95 birds examined in 1961, one had pure white flanks, ten slightly streaked, 67 medium streaked and 17 heavily streaked, more like the condition reported for the Greenland form *C.f. rostrata*. The streaked ones included 32 with some buff colour. In 1963 the flanks of 22 were slightly streaked, 33 moderately streaked and twelve heavily streaked.

Under tail-coverts also showed a wide variation. One adult male had completely white coverts, but the rest had streaking from slight to heavy. The same situation was found in the females. Pink and buff tinges were seen on some under tail-coverts. Wing bars were very variable, though they were always buffish on juveniles and white or lacking on adults. Either wing bar might be absent.

It was found impossible to give any individual a subspecific identification based on plumage details. Comparison with skins in the British Museum (Natural History) showed that some could be matched with specimens of *flammea* from north Norway and Sweden, and some with *holboellii* from Finnmark, Tromsø and Sweden. Others were closer to *exilipes* from Norway and Lapland.

Sex and age

In 1961 the number of males caught was more than double that of females (94 males, 43 females). This was the case in both adult and first-winter birds and there appeared to be no explanation for it. Watson (1957) similarly noted a preponderance of males in flocks in July.

There were more adults than first-winter birds in 1961 (76 adults, 60 first-winter), possibly owing to some of the young having left the area after completing their moult. In 1963 on the other hand, 57% (40 out of 70) of those ringed were juveniles, this higher percentage apparently being due to the earlier sampling time. It seems that the birds start moulting in mid-July (as observed in 1963) and finish about mid-September (as observed in 1961).

Measurements

Because of the small number of published measurements of passerines from these latitudes, as many redpolls as possible were measured by the methods given by Cornwallis and Smith (1960). Wing and bill lengths from both years are analysed in figs. 1-3. Those of the juveniles quite closely resemble the adults. Fig. 4 shows wing to bill ratios which it appears have not previously been recorded. The data for the

females on this graph and on fig. 3 appear bimodal, but the numbers are insufficient to be sure that this is significant. Also shown in figs. 2 and 3 are some published measurements for wing and bill lengths in the various subspecies. It would appear, in the main, that our results agree with the figures for *flammea*.

The average weight of nine adult males was 14.3 gm. (range 13-16.5 gm.), of 15 adult females 14.4 gm. (range 12.5-18 gm.) and of 38 juveniles 14.1 gm. (range 11.5-17.5 gm.).

Ringing recovery

One of the redpolls examined in this study has been recovered. This was a young male ringed on 6th September 1961 on Loppa and caught on 3rd December of the same year at Rjazan (54°38'N, 39°45'E), U.S.S.R. This was the largest-billed redpoll caught (12 mm.). In addition, its wing was long (79 mm.) and it appeared to be *C.f. holboellii*. This seems to be the first recovery of a redpoll ringed at this latitude and indicates that there may be mixing between the various forms in northern Europe.

DISCUSSION

It is known that redpolls undergo 'irruptive' or 'invasion' types of migration. Such movements and their causes in northern Europe have been discussed by Svärdson (1957) and in Britain by Evans (in preparation). If these movements occur regularly, they may well result in the intermingling of different subspecies and perhaps even the production of a hybrid population.

The flocks of birds seen in 1961, which were not present in 1963, may well have been brought together by localised concentrations of seeds of birch *Betula*. The large moulting flock on Loppa was considerably above the estimated breeding population of 1963. Taylor (1953) considered that the density of redpolls was in direct proportion to the supply of birch seeds. In 1963 the principal food was seeds, and flocks of all ages were seen feeding among mown hay and in birch scrub. It is possible that in 1961, before the moult, redpolls moved on to the island because of food shortage elsewhere; alternatively, there may be a highly fluctuating breeding population in the area.

The population in the area studied would seem to be neither *C.f. flammea* nor *C. hornemanni exilipes,* but rather shows characters linking the two. It apparently fits the convenient niche of *C. hornemanni pallescens* (see Stejneger 1884, Payn 1947) which is perhaps better named *C. flammea pallescens,* as *flammea* is the older species name.

SUMMARY

Visits were made to Øksfjord and Loppa, Finnmark, Norway in 1961 and 1963, when 237 redpolls *Carduelis flammea/hornemanni* were caught, ringed, examined and released. The variety of plumage characters tends to confirm that the birds there

form a hybrid swarm and it was found impossible to assign any specific identifications. This agrees with the views of Salomonsen (1928) and Williamson (1961) and it may be that the redpolls are one species group with varying ecotypes. If a name must be used for the 'hybrid' *flammea* x *exilipes*, then it should be *Carduelis flammea pallescens*.

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[Apart from supporting those who regard all the redpolls as belonging to a single species, this interesting paper supplies a cautionary word to anyone who would separate *hornemanni* and *flammea* in the field; in particular, the sentence in italics on page 292 should be noted.—EDS.]

Obituaries

Niall Rankin (1904-1965)

WITH THE SUDDEN DEATH of Niall Rankin last April in Bechuanaland, a great character vanished not only from ornithology and bird-photography, but from the world of adventure and enterprise. By his own confession he was a fortunate and privileged man, but few can have lived more fully than he or more unobtrusively used their opportunities to better advantage. The pity is that he was always so busy with his next expedition that he rarely had time to write up the records of his last—or even to print his negatives. His varied in-

terests led him to many distant lands, from Tibet and Indo-China to the American and European Arctic, and not only for birds. A tribe in Sikkim or a photo-mosaic of Annapurna were as much up his street as the wild geese of Iceland or big game in Africa. He was a wonderful organiser, and he took in his stride visits to Hudson's Bay or, in his own boat, to South Georgia.

Yet, despite his extensive travels, he was essentially a Scotsman. There, in his home country, he was all things—laird, farmer, stalker, shooter, climber, conservationist, yachtsman, ornithologist. If he loved to chase the Emperor Goose to the Yukon or the albatross to Antarctica, at heart he would not have exchanged them for the Black-throated Diver or the Great Skua of his beloved highlands and islands.

He was a very great bird-photographer. Unfortunately much of his work was known only to a few, for he published little and exhibited even less. All of us had hoped that one day he would produce at least a condensed account of his many travels and thus leave behind some record of his photographic skill. As it is, all we have are *Haunts of British Divers* (1947) and *Antarctic Isle* (1951). Latterly, he turned his attention to travel and nature films, and at the time of his death he was making a ciné-record of the life of Cecil Rhodes.

Although a lover of good company, he was very much an individualist, always content to be 'the lone wolf' and just as happy alone with Eskimos or Sherpas. His only concern was that he should be engaged in trying to do or find something in the sort of country he loved—the Himalayas, the Arctic tundra or his own Grampians. It mattered little to him if others applauded, or disapproved of, his purpose. In an age of material ambitions it has been an inspiring privilege to have counted such a man as one's friend.

G. K. YEATES

Clifford Oakes (1894-1965)

WE RECORD WITH SORROW the death of Clifford Oakes at his home in Burnley, Lancashire, on 13th June.

We in Lancashire automatically link his name with those of the late A. W. Boyd and the late Ralph Chislett in the neighbouring counties of Cheshire and Yorkshire, and to many of us, his junior colleagues, his death seems to mark the passing of an era. He belonged essentially to that generation and fraternity of dedicated amateurs who by their enthusiastic field-study and scientific approach laid the foundations of ornithology as we know it to-day. He was, as A. W. Boyd indeed once wrote of him, 'an indefatigable and ever-alert observer'.

He contributed several papers and numerous notes to *British Birds*, to which he was a subscriber from about 1930. In 1933 he joined the

British Trust for Ornithology, for which he later became regional representative. For many years he took the local lead in organising the Trust's Enquiries, and he was also prominent among the pioneers of bird-ringing in the north-west. He was a stalwart member of the Royal Society for the Protection of Birds from the early 1930's, and in 1942 was elected a member of the British Ornithologists' Union. From 1950 to 1956 he edited the Lancashire Bird Report for the Lancashire and Cheshire Fauna Committee, of which he was an honorary member. He was Chairman of the East Lancashire Ornithologists' Club from the date of its foundation until the time of his death.

He was joint author with E. Battersby of *The Birds of East Lancashire* (1939), and in 1953 produced his major work, *The Birds of Lancashire*, of which Dr. D. A. Bannerman, in a letter to him, wrote, 'It is first class and I constantly refer to it when desiring knowledge of Lancashire birds. I consider that with Ticehurst's *Birds of Suffolk* your book takes the highest place in local fauna histories, and I truly congratulate you on such a fine piece of work. Every page spells accuracy, which I value more than all else in bird literature.'

Clifford Oakes would invariably give his willing help and guidance to anyone with a serious and lasting interest in bird study, and there are many who will remember him always with gratitude and affection.

K. G. Spencer and A. Welch

Notes

Birds trapped by sludge on a sewage farm.—During July and August 1964 large amounts of sludge were pumped on to lagoons on the sewage farm at Swindon, Wiltshire, and, owing to a combination of dry weather and frequent pumping, the surfaces became very treacherous with just a very thin crust over deep sludge. Many birds were trapped by breaking through this crust and they then either died or, if they escaped, emerged coated with sludge which quickly set rock hard.

The following species are known to have been involved (the approximate number of each is given in brackets): Redshank *Tringa totanus* (1), Common Sandpiper *T. hypoleucos* (1), Dunlin *Calidris alpina* (2), Kingfisher *Alcedo atthis* (1), Carrion Crow *Corvus corone* (20), Rook *C. frugilegus* (50), Jackdaw *C. monedula* (2), Blackbird *Turdus merula* (1), Starling *Sturnus vulgaris* (30), Pied Wagtail *Motacilla alba* (1) and an unidentified finch. It will be noted that this list includes three species of waders and it seems surprising that even they had difficulty in judging the condition of the surfaces.

Most of the birds which escaped coated with sludge soon fell to predators and some slightly contaminated Carrion Crows subsequently

drowned in settling tanks owing to loss of flight control when snatching food from the water. Several incapacitated birds were rescued, cleaned, fed and released in reasonable condition. G. L. WEBBER

Night Herons swimming.—With reference to J. E. Squire's description of a Little Bittern *Ixobrychus minutus* swimming (*Brit. Birds*, 58: 190), we should like to record the following observations.

At dusk on 12th May 1965, while we were camping by Lake Koronia in northern Greece, a Night Heron *Nycticorax nycticorax* flew towards us across the calm water. Suddenly it landed on the lake and sat there for about a minute with upright neck and horizontal bill. When it took off again, very easily, we saw that all the secondaries on its right wing were missing, but it was flying strongly.

We returned to the lake on 16th May 1965, another calm evening. When the light was rather poor, two Night Herons flew past us parallel to the shore. One landed on the lake for about ten seconds, during which time it picked up something from the surface in its beak. Taking off easily, it then rejoined the other one and appeared to pass this object over. ENID and KEITH ALLSOPP

Peregrine attacking Manx Shearwaters.—I have read with much interest the recent notes and correspondence on Manx Shearwaters *Procellaria puffinus* as prey of the Peregrine *Falco peregrinus* (*Brit. Birds*, 57: 466-467; 58: 149, 153-154). Late on the evening of 17th September 1957, at Porth Kidney which forms part of the very large St. Ives Bay in Cornwall, I saw a Peregrine actually attack some Manx Shearwaters. A strong and gusty north-westerly wind had induced numbers of these sea-birds to come well into the bay and they were either gliding offshore or resting on the sea.

After a few minutes a Peregrine appeared high overhead and stooped at an acute angle which brought it close to one or more of the flying shearwaters. The latter, however, by keeping a little above the sea, avoided direct attack and when the predator came within striking distance they sought refuge by flopping into the water and disappearing momentarily below the surface. Then, in a series of low-level attacks, the Peregrine pursued the shearwaters by flying just above the waves at considerable speed, but they either took evasive action as described above or, if they were resting on the sea, hurriedly moved off across the water by frequent 'belly-scurryings' and occasional dives. It was not long before they had all moved right away and so, unfortunately, I do not know whether the Peregrine was eventually successful in catching one. BERNARD KING

Inland passage of Oystercatchers in northern England.—D. G. Andrew (*Brit. Birds*, 52: 216-220) has shown that there is an inland passage of Oystercatchers *Haematopus ostralegus* in southern Scotland

during the late summer months, whilst observations by J. and G. Griffiths (*Brit. Birds,* 56: 460-461) indicate a similar passage in central Wales with, also, a smaller movement in spring.

An examination of recent ornithological reports from Lancashire, the Lake District and Yorkshire reveals that over northern England, too, there is a regular twice-yearly passage, most noticeable in late summer. The numbers involved are usually small, flocks of 25 by Ennerdale Water on 3rd August 1961 (*The Birds of the Lake Counties, Trans. Carlisle N.H.S.,* vol. x) and 20 at Gouthwaite Reservoir on 15th August 1962 (*Yorkshire Naturalists' Union Orn. Report for 1962*) being the largest that have come to our notice.

In those cases where the birds have been seen actually *en route* in late summer the direction has almost invariably been westerly. For instance, during the late summer of 1964, at Ribchester on the River Ribble, parties of up to eight were on many occasions seen travelling in that direction. Conversely, in the spring of 1965, at the same place, similar parties were commonly to be seen flying eastwards: on 5th May, for example, a total of twenty Oystercatchers passed during a three hours' watch, their high and direct flight rendering them distinct from the small population that breeds thereabouts.

Although the above observations do not prove coast to coast passage, its probability is further supported by the records of nocturnal migration over Carlisle cited by H. A. Macpherson in his *A Vertebrate Fauna of Lakeland*; this was published in 1892 when inland breeding of Oystercatchers in northern England was still very exceptional.

K. G. Spencer and M. Greenhalgh

Oystercatcher killing young Ringed Plover.—On 16th May 1965, at Walney Bird Observatory, Lancashire, I was watching a family party of Ringed Plovers *Charadrius hiaticula* when one of the three week-old chicks approached an Oystercatcher *Haematopus ostralegus* which was feeding close by. The Oystercatcher picked the chick up in its bill and shook it three or four times before taking it to a shallow pool some yards away and sweeping it from side to side under the water. It was difficult to be certain whether it drowned the young Ringed Plover or whether the latter was already dead as a result of the shaking. Unfortunately, I disturbed the Oystercatcher at this point and it flew off, leaving the dead chick in the pool. Throughout the whole episode the adult Ringed Plovers took very little interest in the proceedings. I might add that the Oystercatcher had a nest about 70 yards away, from which it had got up when I originally arrived. W. H. Tickle

[The explanation of this episode may lie in the last sentence, for birds disturbed at the nest will sometimes make seemingly senseless attacks on other creatures in the vicinity.—Eds.]

Ruffs following a plough with Black-headed Gulls.—On 1st April 1965, on the Inner Ribble Marshes, Lancashire, I watched a party of 28 Ruffs *Philomachus pugnax* following a plough with a flock of Black-headed Gulls *Larus ridibundus*. Like the Black-headed Gulls, the Ruffs were spread out over the freshly-turned area, individual groups of them hovering round the plough and dropping to the ground when suitable food was uncovered.

It is not uncommon for Ruffs to feed on ploughed fields in this part of Lancashire, but I have never previously observed them following a plough. M. GREENHALGH

Common Terns feeding on bread.—On 17th October 1963, whilst feeding Herring Gulls *Larus argentatus*, Common Gulls *L. canus* and Black-headed Gulls *L. ridibundus* from the Torpoint Ferry in the Tamar Estuary on the borders of Devon and Cornwall, I noticed that they had been joined by three juvenile Common Terns *Sterna hirundo*. To my surprise, these terns began to dip to the surface and to pick up pieces of bread. They swallowed only the smaller pieces, however, and dropped the larger ones after holding them in the bill for a short time.

S. C. MADGE

Turtle Dove displaying to Collared Dove.—On 10th June 1965, in my garden at Inkpen, near Newbury, Berkshire, I was watching a Turtle Dove *Streptopelia turtur* feeding on corn put out for my domestic pigeons when a Collared Dove *S. decaocto* alighted near-by. The Turtle Dove immediately ran towards the new arrival with a curious, crouching run, bobbing its head at intervals, which gave it the appearance of limping. The Collared Dove flew off, closely followed by the other, and they both alighted on the lawn about forty yards from where I was standing. The Turtle Dove then stood face to face with the Collared Dove, about twelve inches from it, and for several seconds bobbed vigorously and rapidly before they flew away together.

R. F. BAWTREE

Great Spotted Woodpecker attacking galls.—The recent note by . K. Woolsey, G. E. Evans and B. Frost (*Brit. Birds*, 58: 150) on a Lesser Spotted Woodpecker *Dendrocopos minor* attacking galls brought to mind a similar observation of mine involving a Great Spotted Woodpecker *D. major*.

In January 1958, near Newcastle upon Tyne, I saw a male Great Spotted Woodpecker searching for food in an oak *Quercus robur*. The bird was moving along the branches of the tree in what I considered a normal feeding manner. However, it then gripped a gall in its bill and tugged until it had detached it. It next flew the short distance to the junction of the branch and the trunk. There it perched on the branch and, inclining its head, began striking the gall against the

trunk. The gall eventually broke and the bird transferred the two halves to its feet, gripping them there while it extracted the larva from the gall. This method of feeding was carried out six times in a period of five minutes. The sound of the gall striking the tree was just audible from about ten yards. D. H. HOWEY

[A letter on 'Lesser Spotted Woodpeckers attacking galls' appears on page 302.—EDS.]

Robin taking bee.—On 30th April 1965, at Hook with Warsash, Hampshire, Roger Brown and I were sitting on a stone seat in my garden when a very tame Robin *Erithacus rubecula* came seeking insects on the ground at our feet. We both distinctly saw it catch a bee which appeared to be a worker Honey Bee *Apis mellifera*. It seemed to pick off and discard the sting and then to kill the bee by crushing its head before swallowing it whole. C. SUFFERN

Review

A Handlist of the Birds of Shropshire. By E. M. Rutter, F. C. Gribble and T. W. Pemberton. Shropshire Ornithological Society, 1964. 59 pages; 2 maps. Obtainable from R. A. Renshaw, 1 Swan Hill, Ellesmere, Shropshire. 7s. 6d.

This modestly produced booklet provides the first full account of the birds of Shropshire for over fifty years and will thus be welcomed both by bird-watchers living within the county and by everyone interested in the distribution of British birds. Following a brief Introduction and an article on the Geography of Shropshire by C. A. Sinker (in which it is made clear that the area covered by the *Handlist* includes the Maelor of Flint), the rest of the book is taken up with a Classified List. This provides concise summaries of the recent status of all species recorded in the county since 1950, while for those species which have shown a change in status during the past fifty years the accounts have been extended to include earlier information. Fifty or so species recorded only prior to 1950 are merely listed in an Appendix.

Many interesting changes are seen to have occurred over the past thirty to fifty years. As in many other parts of England, the Red-backed Shrike and Wryneck have probably been lost as breeding species, and possibly also the Cirl Bunting and Black Grouse. On the other hand, the Little Owl, Black-headed Gull, Redshank and Collared Dove have been gained. Over the same period several species have shown a marked decline in numbers or range, but, at least in terms of the number of species involved, these losses have been offset by other species which have increased. A number of passage migrants previously considered unusual in the county, especially certain waders, have recently been found to be regular visitors.

Shropshire is a large and varied county and for recording purposes it has been divided into eight mainly natural areas which are carefully defined in the book. These areas are constantly referred to in the species accounts and, especially for local breeding species, a clear picture of distribution within the county emerges. The system adopted has much to recommend it and could usefully have been employed in some other recent but more elaborately produced county avifaunas. As well as giving a valuable up-to-date survey of the county's birds, this *Handlist* will provide a sound basis for future work on bird distribution in Shropshire. The booklet is generally quite well produced, but a better map of the county and, particularly, a more attractive cover would surely have improved sales to the general public.

J. L. F. Parslow

Letters

Post-mortem condition of birds found dead during the 1963 cold spell

Sirs,—I was interested in Dr. H. M. M. Mackay's letter on 'Nutritional oedema as a possible cause of excess weights in severe weather' (*Brit. Birds*, 58: 198-199). During the cold spell in January and February 1963, 96 dead birds of various species were examined at the Ministry of Agriculture Veterinary Laboratory at Lasswade, Midlothian, but no case of nutritional oedema was observed. The bodily condition and weights of the dead birds could be placed in two clearly defined categories determined by the duration of survival after the onset of chronic or acute stress.

The first category is illustrated by the findings in the cases of seven Redwings *Turdus iliacus*, three Woodcock *Scolopax rusticola* and four Curlews *Numenius arquata* examined. The weights of these birds, which were emaciated, agreed closely with the 'cold spell weights' recorded by Dr. J. S. Ash (*Brit. Birds*, 57: 221-241) and were approaching half the normal values. All the internal organs were smaller than usual, but there was no evidence of organic disease. Such findings are probably associated with severely curtailed food intake over a period of at least several days of continuous frost.

In sharp contrast, 31 dead Starlings *Sturnus vulgaris*—birds which are largely dependent on man for food—had normal or above-average weights and were all in good condition with layers of fat under the skin. Most of these had died relatively suddenly at town and country roosts after a night of very severe frost ($-11°$ C). The prominent feature on autopsy was dehydration and inflammation of the kidneys (nephritis). The origin of most cases of nephritis in birds is not well understood. It is one of the commonest non-specific causes of death,

but often the reasons for the functional collapse of the kidneys are obscure. They appear to be the organs most susceptible to any acute stress such as chilling or water shortage, both of which factors would be operating at extremely low temperatures. The dehydration or lack of fluids in the tissues may be brought about by an upset in the bird's water balance due to impaired kidney function caused by chilling. Alternatively, a lack of readily available supplies of drinking water at such times may be the primary cause of damage to the kidneys.

Oedema does occur in mammals and birds as a result of heart and liver disease, but, whereas the accumulation of dropsical fluid is a common feature of certain types of mammalian nephritis, the opposite effect—namely, dehydration—is the cardinal feature of nephritis in birds. One must conclude, therefore, that extra fat deposition rather than fluid retention is the cause of the above-average weights encountered during cold weather. J. W. MACDONALD

Lesser Spotted Woodpeckers attacking galls

Sirs,—A recent note by A. K. Woolsey, G. E. Evans and B. Frost (*Brit. Birds,* 58: 150) described attacks by a Lesser Spotted Woodpecker *Dendrocopos minor* on galls on dog-roses *Rosa sp.* It therefore seems worth drawing attention to the fact that attacking galls, particularly those on oaks *Quercus sp.*, is a regular habit of this species. My observations at Leyland, Lancashire, have shown that Marble Galls, formed by the small gall wasp *Cynips kollari*, are regularly opened by Lesser Spotted Woodpeckers throughout the winter, and this food is also specifically recorded in *The Handbook*. The tit-like postures described by Messrs. Woolsey, Evans and Frost are also quite typical. The galls are always opened *in situ* and I have no record of their being removed first. A major ecological difference between this species and the Great Spotted Woodpecker *D. major* is its tit-like ability to feed out on small twigs.

Feeding on galls on roses, which are probably formed by another of the many gall wasps of the family Cynipidae, is thus an interesting extension of a well developed habit. J. H. LAWTON

[A note on 'Great Spotted Woodpecker attacking galls' appears on pages 299-300.—EDS.]

'Feldmaus' and the food of the Kestrel

Sirs,—It is a pity that O. Uttendörfer did not use scientific names for prey species in the main text of his book on the food of birds of prey (1952, *Neue Ergebnisse über die Ernährung der Greifvögel und Eulen*), for there seems to be much confusion over the meaning of the word 'Feldmaus' which he gave as forming 80% of the food of the Kestrel

Falco tinnunculus on the Continent. In an earlier letter, in 1960 (*Brit. Birds,* 53: 527-528), I pointed out that T. A. W. Davis was wrong to translate this as the Long-tailed Field Mouse *Apodemus sylvaticus* in his paper on 'Kestrel pellets at a winter roost' (1960, *Brit. Birds,* 53: 281-284) and that it is actually the German name for a species of vole *Microtus arvalis.* It is unfortunate, therefore, that the same error has now been made by J. S. Fairley and A. McLean in their recent paper on 'The summer food of the Kestrel in northern Ireland' (1965, *Brit. Birds,* 58: 145-148) and also, incidentally, elsewhere by C. Simms in a paper on 'Indications of the food of the Kestrel in upland districts of Yorkshire' (1961, *Bird Study,* 8: 148-151).

In fact, it seems clear that the Kestrel generally takes what is the most abundant food for its method of hunting. On the Continent this is *Microtus arvalis* (Uttendörfer 1952) and in England the counterpart species *Microtus agrestis* (W. E. Collinge in Uttendörfer 1952, Davis 1960, Simms 1961), but in Ireland, where both these rodents are missing, the Kestrel has to prey on *Apodemus sylvaticus* and small birds (Fairley and McLean 1965). DIETRICH FIUCZYNSKI

Requests for information

Country roosts of Starlings.—A. E. J. Symonds is studying the roosting behaviour of Starlings *Sturnus vulgaris* in Britain and would be grateful for records, both past and present, of the locations of communal country roosts (*not* town roosts) on the scale of the one kilometre squares of the National Grid. Please send details to **A. E. J. Symonds, 7 Park Drive, Felpham, Bognor Regis, Sussex.**

Birds preying on dragonflies.—Bryan L. Sage has for some years been collecting data on the extent to which dragonflies (Odonata) are preyed upon by birds in the British Isles. This is a subject which has received a good deal of study in America, but which is much less well documented in this country. He will be grateful for any records, particularly ones which have not previously been published or which have appeared in non-ornithological literature. The basic details required are the date, the locality, the species of bird and, if known, the species of dragonfly; where a dragonfly was actually seen being eaten it would be of interest to know whether or not the wings were discarded. In the event of a paper being published, full acknowledgement will be made. Records should be sent to **Bryan L. Sage, 11 Deepdene, Potters Bar, Middlesex.**

News and comment

Edited by Raymond Cordero

Nature Conservancy's changed status.—On 1st June the Nature Conservancy became a committee of the Natural Environment Research Council (N.E.R.C.) which was set up on that date. Prof. R. O. Buchanan, Prof. H. Godwin, Sir

James Denby Roberts, Bt., and Prof. P. F. Wareing have become members of the Nature Conservancy, and Lt.-Col. J. P. Grant, G. V. Jacks and Prof. C. F. A. Pantin have retired. Under the new charter the territorial committees will become sub-committees.

Prof. J. N. Black (Department of Forestry and Natural Resources, University of Edinburgh) has joined the Scottish Committee in succession to Lt.-Col. J. P. Grant, as well as the Scientific Policy Committee on which Professor Wareing also serves. J. T. Coppock (Department of Geography, University College, London), J. R. Herbert (Honorary Secretary of the Institute of Landscape Architects) and R. B. Verney (Past President of the Country Landowners' Association) have become members of the Committee for England from which Prof. J. H. Burnett, H. G. Hurrell, Dr. A. M. Massee and Dr. S. M. Walters have retired. Dillwyn Miles (Honorary Secretary of the West Wales Naturalists' Trust) and Dr. Rees Prytherch (Member of the Gwynedd Rivers Board) have joined the Committee for Wales in succession to J. H. Barrett and T. A. W. Davis.

The chairman of N.E.R.C. is Sir Graham Hutton.

Proposed new legislation for the protection of birds.—Lord Hurcomb's Protection of Birds Bill has passed all its stages in the House of Lords and now goes to the Commons, but seems unlikely to become law quickly owing to lack of Parliamentary time. This Bill, which amends the Protection of Birds Act 1954, contains a number of provisions. It would give complete protection to the eggs of the Lapwing, which at present can be taken up to the middle of April, and would remove from the Home Secretary a power which he holds at present to exempt certain common birds' eggs from the protection they normally receive under the 1954 Act. It would also prohibit the sale of dead wild geese; this would in no way limit the rights of the wildfowler, while preventing commercial exploitation of the sport. Another provision would make it illegal to disturb wilfully about fifty rare birds at their nest; this is, in the words of the Council for Nature summary, 'to curb the growing danger to certain uncommon species from a minority of careless bird-photographers'. The Bill would establish legal control for bird-ringing, permitting trapping and ringing only when licensed, on the recommendation of ornithological organisations. It would also allow the Home Secretary to suspend all or some wildfowling during hard weather; this was to some extent achieved voluntarily in 1962/63.

Osprey success and failure. The Royal Society for the Protection of Birds has revealed that the egg(s) of the Loch Garten Ospreys hatched on 23rd May in the nest which has now been occupied for seven successive years and from which twelve young were safely reared between 1959 and 1964; only one youngster was seen this year, however, and that made its first flights on 20th July. A second pair of Ospreys returned to the undisclosed Speyside eyrie they have occupied for the past two seasons, but for the third year in succession the eggs failed to hatch and they have now been taken for analysis to see if they contain residues of organo-chlorine pesticides.

K. E. L. Simmons's work on Brown Boobies.—K. E. L. Simmons, well known for his studies of anting behaviour and of Great Crested Grebes, is now working at the University of Bristol preparing for publication his work on the behaviour and ecology of the Brown Booby *Sula leucogaster*. When living on Ascension Island in 1962-64, he kept detailed histories of about 100 individuals, and he intends to make a return visit to the island next year. On completion of the booby work, Mr. Simmons hopes to stay on at Bristol and do further research, probably on a comparative study of the behaviour of grebes, using his existing, but largely unpublished, work on Great Crested Grebes as a basis.

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British Birds

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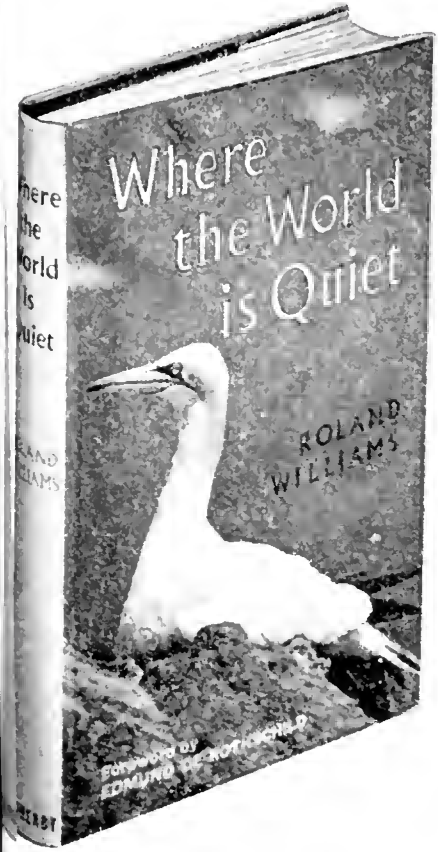

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British Birds

Vol. 58 No. 8

August 1965

Pied-billed Grebe in Somerset: a bird new to Great Britain and Ireland

By Robin J. Prytherch

At Blagdon Lake, Somerset, during the afternoon of 22nd December 1963, H. A. Thornhill drew my attention to a small grebe on a patch of open water at the edge of the otherwise almost completely frozen lake. It was swimming quickly among Mallard *Anas platyrhynchos,* Wigeon *A. penelope,* Tufted Ducks *Aythya fuligula* and Coots *Fulica atra.* It did not seem to fit any of the European grebes described and illustrated in *A Field Guide to the Birds of Britain and Europe* by Roger Peterson, Guy Mountfort and P. A. D. Hollom (1954) and after three-quarters of an hour I had still not identified it.

COMPARISON WITH EUROPEAN GREBES

Size. Comparing the grebe with the Coots and ducks, I estimated it to be only slightly larger than a Little Grebe *Podiceps ruficollis* and so there was no question of its being either a Great Crested Grebe *P. cristatus* or Red-necked Grebe *P. griseigena.*

Shape and stance. When I first saw it, I immediately thought of a Black-necked Grebe *P. nigricollis* or a Slavonian Grebe *P. auritus* because of the way it held its head high on its long (but not thin) neck with its body low in the water. However, when it also held its head low, this and the puffy effect of the flank feathers suggested a Little Grebe, though it did not really look like one. It always held its body low in the water while I was watching it.

General coloration. It was not 'black-and-white': no part of the plumage was black or even blackish, and the only white visible was a very small area on the chin. This lack of contrast seemed to rule out Black-necked and Slavonian, and the general pattern of the head also appeared to exclude these species and Little Grebe. Its head was

almost entirely pale grey-buff, being dark (dark grey-buff) only on the forehead and crown with a slightly darker stripe through the eye and a small white area on the chin. The darker and white areas merged into the pale grey-buff, which extended to the neck.

Bill. The bill was completely 'wrong' and out of all proportion to the bill of any grebe seen previously by me or described in the *Field Guide*. It was short and stubby, being very thick at the nostrils with the culmen decurved to the tip. It was dusky grey (looking pale, not blackish) with a very slight dull yellow-greenish tinge. It was far too thick and short for Black-necked, Slavonian or Little.

Eyes. The dark reddish-brown eyes seemed closest to those of a Little Grebe.

BEHAVIOUR

The nervous actions of the grebe indicated its concern at our presence. The Coots and ducks had made off across the ice or flown away within ten minutes of our arrival, leaving it on its own. It then started trying to disappear. It would dive at the edge of the ice and allow just its head to appear above the surface of the water with its body under the ice. However, it was apparently forced up each time within about three-quarters of a minute by the buoyancy of its body. It did this many times, also by some reeds which it used as extra cover. It also sometimes stayed at the side of the ice with its head down just above the water and its body so low that only the rear half of its upper-parts and flanks were showing; it would remain like this for periods of half a minute or more when it was as far away as the free water would allow (about 35 yards). When diving it had a trick of disappearing head last, with the obvious effort of thrusting itself down breast first. However, in most dives the whole bird quickly sank below the surface as it thrust its head down. It did not jump up to dive, nor did it disappear tail last.

DETAILED DESCRIPTION

The forehead and crown were dark grey-buff. The nape and back of the neck were fairly pale grey-buff, darkening on the back which was very dark grey-brown. The sides of the face (from well above the eye round to the nape and throat) were pale grey-buff, except for a very slightly darker stripe through the eye (ending approximately half way to the nape) and a small white area on the chin at the base of the bill. The light and darker areas on the head merged together and were not sharply contrasted. The paleness of the face extended to the throat and long neck, with the back of the neck slightly darker. The lower part of the neck was also slightly darker, being grey-buff, and this colour darkened still more on the breast which in turn merged into dark grey-buff on the flanks; the latter often had a puffed appearance.

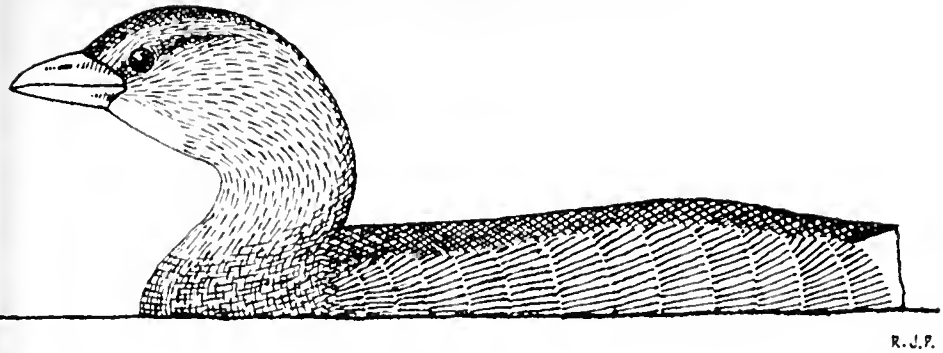

FIG. 1. First-winter Pied-billed Grebe *Podilymbus podiceps*, Blagdon Lake, Somerset, 22nd December 1963 (*drawn by Robin J. Prytherch*)

The bill was short and thick, the depth at the base appearing to be more than half the length of the culmen, which was decurved at the tip; it was dusky grey with a very slight dull yellow-greenish tinge. The eyes were dark reddish-brown.

CONCLUSION

H.A.T. and I left the bird without knowing what we had been looking at. A fortnight later I was still so puzzled by it that I decided to investigate further. After reference to *The Handbook* I felt sure that it was not a British grebe. I therefore looked at books referring to other parts of the world and, after only a quick glance through the *Field Guide to the Birds of the West Indies* by James Bond (1947) and *The Birds of Trinidad and Tobago* by G. A. C. Herklots (1961), I realised, with much surprise, that it was an American Pied-billed Grebe *Podilymbus podiceps*. Subsequent reference to the *Handbook of North American Birds*, vol. 1, edited by Ralph S. Palmer (1962), showed that it was in first-winter plumage.

Fortunately, when H.A.T. first saw the grebe he took a short ciné-film of it in colour. It was apparently not so alarmed then as when I watched it and there are short sequences revealing a white 'rear end' (under-tail), which I did not see. Fig. 1 is based on sketches made at the time and on my notes, but the shape and stance have been corrected from the film. I should like to express my sincere thanks to H.A.T., not only for asking me to look at the bird in the first instance, but also for making his film available to those concerned with the acceptance of the record. It confirmed the identification.

NOTES ON THE SPECIES

The following summary of the field characters, distribution, migrations, habitat and breeding of the Pied-billed Grebe has been compiled from the *Handbook of North American Birds*, *A Field Guide to Western Birds* by ... T. Peterson (1961) and the *Audubon Water Bird Guide* by R. H. Pough

(1951). The notes refer to the race *P. p. podiceps;* two other races occur in the West Indies and in Central and South America.

It is a small grebe (about the size of a Black-necked). The short, thick bill, which has the culmen decurved to the tip, is distinctive at all ages. In summer this is whitish with a black band around the middle; the plumage is then mostly drab grey-brown, but with a black throat patch and white under tail-coverts. In winter the bill is plain, dusky or yellowish, and the black throat patch is replaced by white; also the neck, breast and flanks tend to be reddish-tawny (often quite vivid). Adults have white eye-rings, but these are lacking in first-winter plumage, which also tends to be dull yellowish-brown (instead of tawny) on the neck, breast and flanks.

It is the most widespread of North American grebes and breeds from Nova Scotia west to south British Columbia and Vancouver Island, southwards throughout the United States to Central America. It winters on the Atlantic coast south from Maryland, on the Pacific coast south from British Columbia, and in the southern states to Central America. It is also regular in winter in Bermuda and accidental in the Azores. The main migrations, which are nocturnal, take place during March and April in the spring and during September and October in the autumn, but some individuals often remain in the north until the ponds and lakes freeze, and likewise some return north at the earliest opportunity in the spring.

In the breeding season it is skulking and keeps mainly to shallow freshwater ponds, streams and inlets of lakes with plenty of emergent vegetation for cover, also marshes with open areas of water. On migration and in winter it is often more conspicuous in exposed situations on lakes and in coastal brackish and salt waters; at these seasons it is usually seen singly, but sometimes it is found in pairs or small parties and, where numerous, in flocks of 1,000 or more. A nest of floating or semi-floating vegetation is built in a concealed situation, and anchored to growing or dead reeds and bushes. The four to seven pale blue or greenish-white eggs soon become stained with brownish. The striking black-and-white striped young hatch after about 23 days.

The diving behaviour observed in the Somerset bird seems to be characteristic.

AN OLD BRITISH RECORD

There is an old record of a Pied-billed Grebe in Dorset in 1881, published in the *Proceedings of the Zoological Society* (1881:734) as follows:

> 'Mr. R. Bowdler Sharpe, F.Z.S., exhibited a specimen of *Podilymbus podiceps* of North America, stated to have been killed at Radipole near Weymouth in January 1881, and belonging to the collection of Mr. R. W. Munro.'

However, in *The Zoologist* (1881:334), J. E. Harting gave this additional information:

> 'On the reported occurrence in England of the American Pied-billed Grebe.—At a meeting of the Zoological Society on 21st June last, Mr. R. B. Sharpe exhibited a specimen of *Podilymbus podiceps,* stated to have been killed at Radipole, near Weymouth, in the winter of 1880-81. Such an occurrence is highly improbable, not only from what is known of the habits of this bird,—which although common in North, Central, and some parts of South America, has never, so far as I am aware, been met with in Europe,—but also because the appearance of the specimen exhibited seemed to preclude the possibility of its having reached this country otherwise than in a preserved state. It is a young bird, with traces of the longitudinal dark stripes on the neck, which are observable in the young of all the Grebes. The birdstuffer from whom Mr. Sharpe received it must have made some mistake in supposing that it was killed near Weymouth, perhaps confounding it with the young of one of our British Grebes in a similar state of plumage which may have been sent to him from that neighbourhood. It is desirable that this should be noted, lest hereafter, in consequence of the published report of the exhibition of the specimen in question, there may be supposed to be grounds (which, in my opinion, do not exist) for regarding this species as an accidental wanderer to Europe.'

Howard Saunders mentioned this record in his *An Illustrated Manual of British Birds* (1889:710) and seemed to sympathise with Harting's opinion, but it is not referred to in *The Handbook of British Birds,* vol. 4 (1940).

[Mr. Thornhill's film has been seen by a number of experienced observers, including P. A. D. Hollom, P. J. Stead and D. I. M. Wallace who know the Pied-billed Grebe in America, and all concerned agree with Mr. Prytherch's identification. As this issue goes to press, a strange coincidence has produced another observation of this species in Britain. An adult in summer plumage was identified near Harrogate, Yorkshire, on 9th June and was still present in July. Details of this second record will be published when it has been accepted.—EDS.]

Bimaculated Lark on Lundy: a bird new to Great Britain and Ireland

By Michael Jones

ON THE AFTERNOON of 7th May 1962 I noticed an unusual bird feeding with a flock of Linnets *Carduelis cannabina* on Lundy, Devon. It was clearly a lark, but it attracted my attention because of its large size, heavy build and light sandy colour. It was fairly tame and

allowed a reasonable view, but I was unable to identify it and so quickly fetched Richard Carden, my assistant warden, for a second opinion. We returned straight away to the spot, but it was by then very misty and raining, with the result that we caught only short glimpses of the bird, usually in flight. However, it stayed in the same area until 11th May and during those next four days we spent several hours watching it at close ranges and in both bright and dull lights. Unfortunately, it carefully avoided all attempts to mist-net it, but we kept very full field notes from which the following detailed description has been compiled:

Upper-parts: crown dark brownish-grey (no crest); nape sandy-brown or pale fawn, unstreaked or very lightly flecked with darker brown; mantle and back sandy, streaked with darker brown; rump sandy or fawn and unmarked; tail like rump at base but shading into golden-brown with a narrow tip of white or whitish (produced by a light spot at the end of each feather). *Sides of head:* sides of face pale buff with a dark line through the eye and a broad pale supercilium; ear-coverts outlined in dark brownish-grey, this forming a continuation of the eye-stripe (see fig. 1); sides of neck as nape. *Wings:* coverts sandy with darker brown tips to the lesser and median forming two brown bars; primaries each had one web light and the other dark brown, producing a contrasted longitudinal striping (see fig. 1). *Under-parts:* throat pale; breast pale with a sandy tinge spreading round from the neck; distinct black half-collar in the form of two crescents meeting in a point in the centre, also a roughly circular dark splodge on a sandy area below (see fig. 1 inset); rest of under-parts uniformly pale buff. Bill stout and yellowish; legs yellow-brown.

For the first day or two the bird was always feeding voraciously on short pasture cropped by sheep, often with Turtle Doves *Streptopelia turtur,* and when disturbed would fly fairly low in a circle and quickly return to the same spot. It was frequently chased by Skylarks *Alauda arvensis* and was easily distinguishable from them, both on the ground and in flight and even at a distance with the naked eye, by its larger size, plumper build, much stouter bill and lighter colour. Its tail was also much shorter and broader than a Skylark's and this, combined with its heavy build, gave it a distinctive silhouette in the air. The general impression was of a sandy-brown lark, boldly marked with darker brown stripes on the back and with barring and striping on the closed wing; but the conspicuousness of this pattern varied with the intensity of the light, and in very bright sun the whole bird appeared an almost uniform light sandy-brown.

The very short tail combined with the prominent black marks on the upper breast and the heavy bill made us think that the bird must be a Calandra Lark *Melanocorypha calandra,* but several characters seemed wrong. In particular, the black collar, perhaps the most prominent single feature, was continuous round the front half of the neck and, when the bird stood erect, a front view showed that it consisted of two crescents joining below the throat rather than a uniformly broad band.

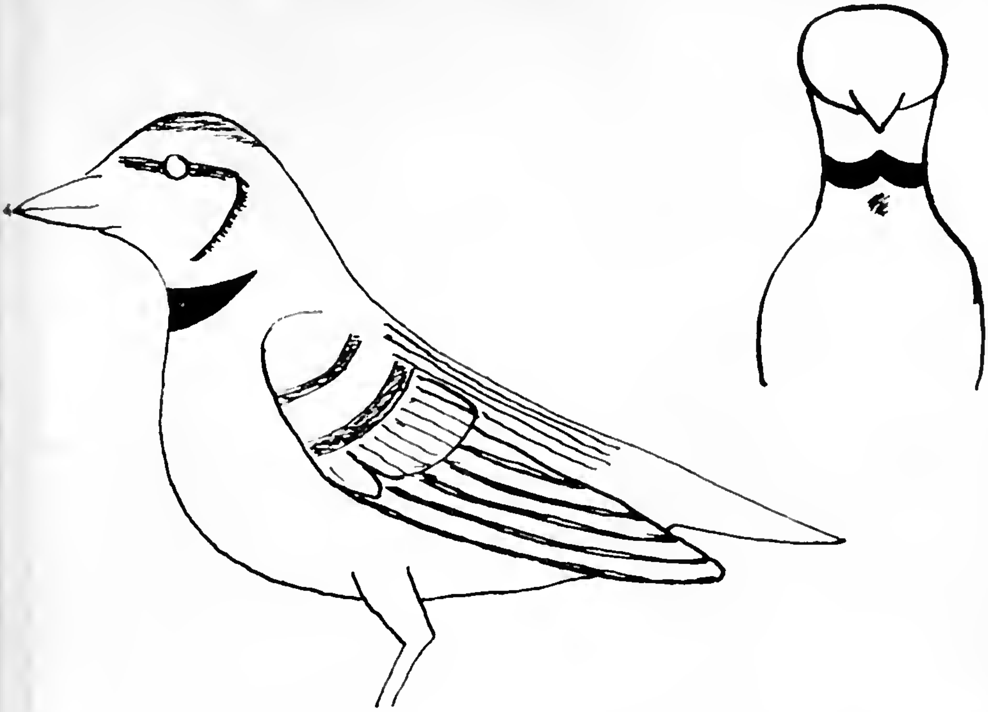

FIG. 1. Diagrammatic sketches of Bimaculated Lark *Melanocorypha bimaculata*, Lundy, Devon, 7th-11th May 1962, to show the prominent markings on head and wing and (*inset*) the shape of the black collar and the dark splodge below it (*drawn by Michael Jones*)

At the same time, we could see no sign of white at the sides of the tail, though the whitish tip was very noticeable in flight, and there was no white trailing edge to the wing.

The lark was always on the ground and was never seen to perch on walls or bushes, although these were at hand. It flew very little and never very high or far and it always started feeding again as soon as it had landed. Worms were the only food it was seen to eat. It walked with a rather bold and rolling swagger which was reminiscent of a Starling *Sturnus vulgaris*, but was never observed to hop. It was once seen to take a dust-bath. It often crouched and at first it uttered most of the song or sub-song that we heard from this position. Whenever we flushed it, it uttered short calls not unlike those of a Skylark but more mellow and subdued—generally *prrp* or *chirrp* but occasionally *prrp-cheewit-chewit*. By the third day it had begun to sing regularly, particularly when it was startled, and it then did so both from the ground and in flight. The song was a rather chirpy trill with more of a rattle than a Skylark's and rising and falling very little. It seemed abrupt, monotonous and subdued, each phrase disjointed and as though squeezed out with an effort, which may have meant that it was still not the full song. Individual sounds we noted in the song were written as *prrp, cheewit, che-wit-che* and *chirp*.

Although the bird was on the island for a total of five days, it was seen only by Richard Carden and myself because no other ornithologists were present. Neither of us had any experience of the Calandra Lark and so, in spite of the discrepancies in the description, we concluded that this was what it must be. However, when the details were submitted to the Rarities Committee, they had no hesitation in identifying it as a Bimaculated Lark *M. bimaculata,* an eastern species of the same genus as the Calandra which had not previously been recorded in Britain. Our thanks are particularly due to Kenneth Williamson who kindly made a detailed comparison of our notes with museum specimens of the Bimaculated Lark and all other possible species of *Melanocorypha.*

[This most interesting record illustrates the importance of writing down what one sees and not, after looking at books, what one thinks one ought to have seen. The observers are to be congratulated on producing such a careful description of the bird that they observed, even though some of the details seemed 'wrong' at the time.

According to C. Vaurie (1959, *The Birds of the Palearctic Fauna,* 1:35), the Bimaculated Lark, or Eastern Calandra Lark, breeds in 'Western Asia from Asia Minor and Near East to northeastern Afghanistan, north to southern Urals, Kirghiz Steppes east to Zaisan Nor. Migrates to Egypt, Sudan, Arabia, Ethiopia, and northwestern India (Punjab and Sind). Habitat same as *M. calandra* but often on more barren soil and higher regions to about 2700 metres.' The western race *rufescens,* found in Asia Minor, Syria, Lebanon and Iraq, is much more rufous above and buffer below than the Lundy description. There is only one previous west European record of the species and that was in Finland on 13th January 1960 (*Orn. Fenn.,* 37:100).

Apart from the continuous pectoral band of black with a brownish area below (the two dark crescents may or may not meet in the middle like this) and apart from the lack of white in the outer tail and on the rear edges of the wing, all of which the observers particularly noted as apparent discrepancies, there are several other features in their description which show that this bird was a Bimaculated Lark and not a Calandra. These include the very sandy colour; the whitish spot at the tip of each tail feather, giving the appearance of a white band in the spread tail; the uniform-looking nape and rump and the brighter, more golden-brown tail; the appearance of a double wing-bar; the broad, pale supercilium separating the darker crown and dark eye-stripe; and the dark brown 'outline' to the ear coverts.—EDS.]

The behaviour of the Gannet

By J. B. Nelson

(*Concluded from page 288*)

EGG LAYING

The Ecology of the egg laying of the Gannet *Sula bassana* (effect of density, age and nest position on the onset and synchronisation of laying) is discussed elsewhere (Nelson 1964a and in preparation).

The act of deposition was observed on five occasions on all of which the tail was depressed and guided the egg into the nest—important in view of the Gannet's poorly developed retrieving ability. The one accurately timed laying took two minutes. Eggs may be laid at any time of day, and possibly also at night.

INCUBATION

Gannets (and apparently all Sulidae) lack brood patches and incubate their single egg beneath their webs, which become highly vascularised and hot during incubation. Non-breeding birds caught during the breeding season had cool webs, but no known breeders were caught off the nest, so it was not known whether webs remain hot. Howell and Bartholomew (1962) showed that the mean internal temperature of incubated eggs of the Red-footed Booby *S. sula* was 36° C. and the foot temperature 35.8° C., and suggested that the feet do not provide the main source of heat for incubation. They were vague in their alternative and the difference in the temperatures they recorded would seem too small to disprove the conventional view. The egg temperature achieved by this method compares favourably with that of brood-spot incubation (e.g. 36.6° C. for the surface temperature of Herring Gulls' eggs: Baerends 1959).

The egg is relatively small and thick-shelled and the surface area of the webs, about 46 sq. cm., is certainly enough to cover the exposed part. The egg is most frequently brooded lengthwise, though also crosswise, the webs being placed one after the other on either side of the egg and overlapping. The incubating bird then settles, adjusting itself with slight rocking or 'nest settling' movements. Positions are shifted several times an hour and nest settling movements made more than twice as often. During very warm weather the egg is sometimes transferred to the upper side of the webs or the incubating bird stands with the uncovered egg between its webs, presumably to cool it.

Although some single-egg laying species are incapable of hatching two eggs (e.g. the Laysan Albatross *Diomedea immutabilis:* Rice and Kenyon 1962), the Gannet, like most Sulidae, can do so. The hatching success of experimentally doubled clutches was equal to that of singles

(87% and 85% respectively) though the average incubation period was 46 days compared with 44 for singles. This was due to less efficient covering rather than chilling resulting from egg transference; transferred single eggs did not take longer than normal to hatch. The two eggs were incubated in almost any position, provided the long axis was horizontal. The incidence of rising and settling greatly increased after donation of an extra egg (*cf.* Beer 1961). Incubation may be less efficient in first-time breeders, since a lower percentage of their eggs hatched, though figures for respective infertility rates were not obtained. One such female at first incubated the egg on top of her webs and later lost it. However, there is no difference in incubation period between first-time breeders and experienced birds.

Behaviour during incubation

Except when sleeping, Gannets rarely incubate for more than ten successive minutes without also performing numerous other behaviour patterns. Spells of activity alternate with periods of rest. Certain activities are linked (e.g. menacing, touching nest material and bowing) and when one occurs at much higher frequency so do the others. Other activities (e.g. nest digging) occur in concentrated spells at intervals in contrast to rotary head shaking which occurs at a fairly uniform level. The commonest activity is touching nest material, since this occurs as a displacement activity in conflict situations as well as autochthonously. Preening and ordinary head shaking are the two other commonest behaviour patterns.

During incubation, quiet spells are usually ended by a sudden stimulus such as the arrival or departure of a neighbour. The activity resulting (e.g. menacing) then leads to another activity, such as egg shifting as a result of changed position. However, some activities occur without any such observable stimulus.

Part played by external stimuli

The onset of incubation behaviour might conceivably be released by the external stimulus of the egg in the nest and might also require the bird to be in a particular hormonal state, or perhaps, in the female, require the prior act of laying. To test this, 21 eggs were donated to different nests in the pre-laying period and the reaction of the birds recorded. Where the egg was rejected the date on which their own egg was subsequently laid was noted. The substitutions were of fresh Gannet eggs, except for three pot eggs, smaller than a Gannet's, and one Shag egg.

There were 12 outright rejections, involving both male and female, in which the Gannet gripped the egg between its mandibles and either placed it on the rim of the nest with mandible vibrations as in deposition of nest material, jabbed it in the bottom of the nest, pushed it over the

rim or ignored it. Eleven of these nests were subsequently laid in six, nine (four cases), ten (two cases), 14-19, 20, 21 and 27 days later.

The remaining nine eggs were accepted (three by males, two by females and four by birds of unknown sex), but five of them only temporarily. Birds which continued to incubate and hatch the foster eggs failed to lay their own, an inhibitory effect known in many other species. Of the five which accepted the foster eggs only temporarily, one did not lay and the remaining four laid four, five and nine (two cases) days later. In other words, of birds which did lay subsequently, those which accepted the foster eggs were closer to laying their own than those which rejected them. Beer (1963) also found this for the Black-headed Gull. The tendency to incubate, as one would expect, increases with the laying of their own egg. However, the fact that some individuals rejected a donated egg some days before laying, whilst others accepted one at a similar time may suggest, if incubation depends on a specific hormonal state, that this is reached by different birds at different times in their cycles. Incubation tendency increases with seasonal gonad development, but the response to the egg is apparently present for some time before required. This need not have been the case. Certain aspects of female breeding behaviour can develop independently of others, though all under the influence of oestrogens. Alternatively, incubation behaviour might conceivably have depended on reflexly initiated hormone activity, triggered by the sight or 'feel' of the egg.

Whilst such a strong tendency to reject eggs near to the laying date might not be expected, it was even more surprising to find that a female rejected a donated egg nine days before laying her own, which she then lost, then again rejected a donated egg, but re-laid 20 days after this further refusal. She had therefore recently experienced both laying and incubating, and was within three weeks of laying again, yet rejected a substituted egg. This strongly suggests that incubation tendency is closely linked with the deposition and presence of the egg and quickly wanes in its absence. Of three other eggs donated after natural loss, two were accepted (one a Shag's) and one rejected only two days after the recipient's own had been lost.

Egg-shifting and nest-settling movements

The position of the egg beneath the webs is altered, on average, almost twice an hour, using the lower edge of the closed or slightly open bill pointing backwards between the webs. Settling movements, altering the position of the webs on the egg, are common and invariably follow egg-shifting. Only rarely are they followed by leg or wing stretching, so that they seem to concern incubation rather than the relief of muscle cramp. Nest-settling movements occur even before there is an egg in the nest and become commoner just before laying. Like some of the

adjusting movements in terns (Poulsen 1953), the Gannet's settling movements do not seem to alter the position of the egg but, unlike terns, are caused by feet, rather than body, movements.

Egg-retrieving

Poulsen (1953) concluded that, in all ground-nesters with shallow nests and liable to displace their eggs, egg-retrieving is well-developed. The Gannet, only partially a ground-nester, and with a tall, pedestal nest, shows little retrieving ability if the egg is knocked or experimentally placed out of the nest. This may be because recovery is generally impossible; either the egg rolls into a deep valley between nests or falls over the ledge, and in any case there is very little loss due to accidental displacement. However, eggs placed on the rim of the nest are rolled back into the cup and the bird also attempts, usually unsuccessfully, to retrieve those just within reach though a little below the rim. Even with low rims the egg rolls away from the beak; Gannets seem to lack the steering movement of the egg-rolling Grey Lag Goose *Anser anser* and are very quickly discouraged. I have a single record of a male Gannet which had just lost its egg attempting to roll a neighbour's unattended egg into his own nest. Whereas I have recorded Herring Gulls building many separate nests around eggs successively displaced too far to be rolled, until eventually incubating them several yards from the original site, Gannets do not attempt to incubate outside the nest even where this is possible. Such a response would rarely be useful.

Rôle of the sexes in incubation

When the female first vacates the egg, which, if the male is present, she usually does soon after laying, he immediately begins his first incubation spell, the sight of the egg apparently releasing the appropriate behaviour. The early change-over may be partly due to the female having already spent a long pre-laying spell on the nest. A similar procedure occurs in many other species which habitually take long incubation stints.

Two-hourly checks over several days and once or twice daily checks over several weeks established that the number of incubation stints was roughly equal in the sexes, though the male's were longer (average 35.6 hours against 30.2 hours). In both sexes the spells became slightly shorter as hatching approached, then dropped suddenly after hatching.

Change-over

Arrival of the partner during incubation is followed by mutual fencing and change-over. An odd fact is that before the incoming bird relieves its mate it usually sky-points and moves slightly *away* from the nest before returning and taking over. Departing birds very often elicit mutual fencing intention movements from the partner, as though the

Table 14. **Time taken to change-over by Gannets *Sula bassana* on the Bass Rock**

Sex arriving	Average time	Longest time	Shortest time	No. of cases
Male	7 min. 58 sec.	22 min. 0 sec.	1 min. 30 sec.	31
Female	2 min. 49 sec.	10 min. 35 sec.	0 min. 5 sec.	23

latter is trying to influence it to remain on the site. Once the incubating bird rises, the incomer pushes directly on to the egg and settles down, usually ignoring the mate, who repeatedly sky-points before leaving. Table 14 shows the time taken to change-over, calculated from the time of arrival at the nest to stepping on to the egg. It is clear from these results that females are significantly less willing than males to vacate the egg, which may possibly indicate a stronger incubation tendency or reflect the fact that males have usually been on duty longer (see table 5).

Although change-over times are scattered throughout daylight hours, table 15 shows that there is a tendency for most arrivals to occur between dawn and mid-day, probably representing birds which departed late the previous day, fished in the early hours and then quickly returned.

After change-over, some time usually elapses before the outgoing partner leaves the vicinity of the nest, but once away it does not usually return until the next relief, though I recorded birds flying over and inspecting their nests several times from the air before finally departing. Significantly, these were usually birds involved in competition for mate or site. Occasionally a relieved bird brings nest material and may then

Table 15. **Proportions of arrivals at the nest by male and female Gannets *Sula bassana* on the Bass Rock at different periods of the day throughout the season**

M=male; F=female

	05.00 to 09.00		09.01 to 12.00		12.01 to 15.00		15.01 to 18.00		18.01 to 22.00	
	M	F	M	F	M	F	M	F	M	F
April	6	9	25	7	12	4	14	11	6	6
May	10	10	19	19	20	3	3	10	4	2
June	20	16	16	16	3	15	6	3	3	2
July	5	38	10	12	3	1	1	2	18	10
August	20	16	22	15	2	2	1	0	11	11
September	25	18	16	14	14	5	1	1	5	1
October	24	30	10	20	0	4	12	4	0	0
Average	16	19	17	15	8	5	5	4	7	4

spend further time sleeping beside the nest. I had good reason to believe that off duty birds did not usually congregate in 'clubs', which were composed of immature birds and non-breeding adults.

Hatching

Once the egg begins to chip, it is transferred to the top of the webs; incubation underfoot would crush the weakened shell. In three instances this transference was seen when the egg had developed only a small hole, by which time the chick is cheeping. The stimulus to which the adults respond could therefore be either visual or auditory. It may be recalled that transference of the egg to the top of the webs may also be caused by warm weather. Thus two entirely different stimuli elicit the same response.

The newly-hatched chick is also brooded in this position and in four observed cases aberrant behaviour resulted in its death, the adult continuing to incubate the hatching egg or new chick underfoot. Of 13 other cases, eight eggs disappeared around their due hatching date, and five chicks disappeared at less than five days, possibly also due to trampling underfoot or perhaps to faulty feeding; Snow (1960) stated that Shags sometimes experience great difficulty in feeding small young. Of the 17 cases referred to above, seven were first time breeders—a disproportionately high number. In a further case the small chick almost died during a spell of female attendance in which she trod on it; it then subsequently recovered, but at three weeks died during bad weather. This is probably another case of death due to parental inadequacy. Still, even experienced adults sometimes stand on their newly-hatched chicks, which must be highly resistant to rough treatment. The observed presence of more feathers than usual in the nest at this stage may help to protect the chick.

One female was seen to prise half an egg-shell off the hatching chick in a precisely performed action which was not merely due to accidentally mandibulating the egg-shell with the chick inside. However, it is not necessary, apparently, and chicks are certainly capable of freeing themselves, though they may take over 36 hours to emerge after chipping.

Gannets leave the egg-shell lying around the nest for some time after hatching (up to four days noted) and may eventually drop it over the side or place it on the rim, though sometimes it is merely trampled into the nest. Occasionally it is mandibulated like nest material and pieces are flung away with a quick sideways head shake. This disposal is not practised systematically. Non-removal may be connected with lack of predators which could be guided to the nest by the shell (*cf.* Greenshank *Tringa nebularia:* C. and D. Nethersole Thompson 1942; Black-headed Gull: Tinbergen *et al.* 1962; and terns: J. M. Cullen 1956). The other possible reasons for egg-shell removal discussed by these authors

FIG. 14. (a) Sky-pointing at change-over. (b) Note the 'busked' position of the wings in which rotation lifts their distal ends; they are not spread. (c) The sky-pointing bird walks with a marked swaying gait; the striking lines on the webs and the conspicuous pattern of the facial soft parts are both fully exhibited. Sky-pointing is a pre-movement display, given particularly before and during movement away from the nest; it does not, apparently, 'appease' other Gannets between which the sky-pointing individual must pass (see text)

(such as lacerating the young and nest hygiene) could, of course, account for the Gannet's eventual disposal, though in view of the time lag this seems unlikely.

SKY-POINTING (fig. 14, plate 46b*)

Description

This conspicuous posture has already been mentioned in connection with web lines (page 236). In sky-pointing the closed wings are raised upwards, not outwards, by rotating the humerus in the glenoid cavity and lifting the distal end of the radio-ulna. This 'wing-busking' is a movement performed to some extent during ordinary walking and as part of the wing movement involved in taking flight. The neck is stretched vertically to its fullest extent and held stiffly, whilst the bill points skywards (sometimes even backwards of vertical) and the eyes look binocularly forwards. These features prompted the descriptive name used here, but it should be made clear that in the following discussion the associated *movements* (not merely the frozen posture) are included. This is important when interpreting the effects on neighbours; in fact, one cannot dissociate the two and demonstrate the effect merely of sky-pointing.

In this posture the bird begins slow foot-raising 'on the spot', preparatory to turning and flying or walking away from the nest (see fig. 14a, b) often with a special 'groan'. The striking digital lines are conspicuously displayed by holding the feet in a drooping position so that the upper surfaces are visible to the partner. Blue-footed

*The plates referred to in this paper were published with the first part in the July issue.

Boobies, which have no special features on the tops of the webs, parade with their feet fully and rigidly spread out. Gannets move slowly in the full sky-pointing position with a characteristic rolling gait (fig. 14c, plate 46b) lifting and lowering the feet deliberately, seemingly oblivious to surrounding activity. They may be threatened or even jabbed without abandoning the posture, although their swivelling eye movements show that they are registering the local situation. Sometimes, space permitting, the bird runs a few paces in this posture, or even makes a slight jump.

After the first few careful steps, caution is shed and the Gannet, if surrounded by neighbours, dashes for the fringe or some convenient stopping place. It aids progress by wing-beating as though rowing over the ground and is clearly distressed by the hostile reception, as shown by its gaping and swallowing movements once it reaches a safe point.

The best description of sky-pointing context is that it occurs before and during movement, usually on foot and particularly away from the nest site. Since sky-pointing is such an elaborately exaggerated and common behaviour pattern which often occurs outside the pair relationship, one suspects a signal function in a wider social sphere. It will be shown that sky-pointing clearly elicits reaction from the mate and neighbours, although the reaction of the latter is not beneficial to the sky-pointing bird.

Sky-pointing usually begins on the nest, typically by the relieved bird during change-over (but also by the incomer) just before the former flies or walks off, and may last for two minutes without a break. Usually the bird is surrounded by others (on flattish ground) but may sky-point when completely isolated, moving a step or two in the full sky-pointing position, then running or hopping with the take-off groan. Even then, however, the bird is usually en route from the nest to a take-off point. Birds moving about in the fringe, prospecting, collecting nest material and so on, usually do not sky-point.

When directly preceding flight the full behaviour sequence is: sky-point with wings busked, wings flicked (intention of flight), crouch (intention of jump), actual take-off with tail depressed to increase lift still in sky-pointing position (plate 47b). When preceded by sky-pointing, take-off is also accompanied by the groan in about 60% of cases. Take-off without sky-pointing is accompanied by a groan only in some 20%.

Function

The form of the movement, in which the bill is so obviously removed from the attacking position, clearly suggests appeasement and, despite the lack of any other evidence, this function has been stated or implied (Fisher and Lockley 1954, Tinbergen 1959), sometimes in a highly

committed manner (Barlee 1956). The function according to these authors would be to reduce the tendency of other birds to attack the sky-pointing individual as it moved through the colony to a take-off point. The situations in which it typically occurs seem to require such an appeasement posture, which no doubt influenced previous interpretations. The only way (short of model experiments) to gather evidence on the point seemed to be to observe (a) when, precisely, it occurred and (b) what effect it had on other individuals. Systematic notes were therefore made of about 500 occasions on which it occurred, where there were no additional complications of attack, stealing nest material, disturbance and so on. These fell into seven classes:

(1) Birds leaving their nests to move through the colony sky-pointed and then dashed in 60 out of 83 cases (72%) and merely dashed in the remainder.
(2) Birds moving some distance from their nests but without having to pass through others sky-pointed in 69 out of 76 cases (91%). The differences between categories (1) and (2) suggests that the prospect of passing between hostile neighbours decreases, rather than increases, the tendency to sky-point.
(3) Birds moving only slightly off their sites—a foot or two—sky-pointed in all of 19 cases.
(4) The few records of birds approaching their sites on foot indicate that where they have to pass through others they do not sky-point (no cases out of 14), but where they can approach without they may do so (four cases out of 11 = 36%).
(5) Prior to flying from their nests after change-over, birds sky-pointed in all cases but, taking into account departure after short visits only, in 47 out of 130 cases (36%).
(6) Although sky-pointing never occurs prior to take-off with nest material, birds occasionally walk in this position holding nest material. Birds taking off without nest material other than from their nests sky-pointed in 16 out of 132 cases (12%). Many of these had left the nest on foot and were taking off from some vantage point. In a literal sense, therefore, they were still 'leaving the nest'.
(7) Movement on foot along the fringe of the colony involved sky-pointing in 58 out of 118 cases (49%). Many of the sky-pointing birds had just left the colony, but precise proportions cannot be given, since a bird's behaviour prior to its arrival on the fringe was often missed.

The preceding analysis reveals a posture which, though highly predictable in a few situations, is far from an invariable response to the pre-movement situation. Further it does *not* effectively prevent attack (see below) and is *not* adopted when attack is likely; instead the bird dashes. Sky-pointing usually occurs *before* the bird has been attacked. When attack appears imminent, a bird may 'freeze' in a non-sky-pointing position for over five minutes before dashing.

To see whether sky-pointing reduced the probability of attack, counts were made of its effect on the behaviour of neighbours. In 78 cases of sky-pointing, 60% elicited a menace from previously quiescent neighbours. This should be compared with the effect on neighbours of other movements of roughly similar magnitude. Thus 33 out of 432 rotary head shakes (8%) and none of 56 bows drew menaces. It

appears that sky-pointing is more likely than these other behaviour patterns (both of which involve vigorous movement) to elicit hostile behaviour.

Whilst this may well be due to conditioning, the neighbours recognising sky-pointing as an intention movement of departure probably involving blundering past their nest, it strongly suggests that the performer is not thereby any more immune to attack, but rather less so. In fact the sky-pointing bird actually makes his departure by dashing through the nesting ranks—a procedure he could equally well carry out without the preliminary posturing, since neighbours attempt to bite him in either case.

If an appeasing function seems unlikely on the above evidence, some other must be found for such a striking display. Successful site maintenance and breeding is highly dependent, in the Gannet, on efficient changeover. Unattended nests are liable to lose egg or chick and Gannets cannot return quickly enough to prevent mishaps, once having left. It is therefore important that a conspicuous pre-leaving signal should be given to remove the danger of both adults leaving together. The elaborate and prolonged posturing could clearly perform this signal function; it is certainly recognised and responded to by the mate (fig. 14). This interpretation makes more sense of sky-pointing in the cliff-ledge situation in which it is usually possible to leave without approaching any neighbour—a particularly cogent point since there is much evidence that Gannets are primarily cliff-nesters. The mechanism by which sky-pointing synchronises change-over and induces the non-sky-pointing bird to remain on the site has yet to be worked out.

It may be doubted whether this explanation could account for sky-pointing in situations away from the nest. It may, however, have become 'frozen' into the pre-moving situation, which in this species usually means departure from the nest, and now occurs even when the movement is not merely 'from the nest'.

Although sky-pointing sometimes occurs in sexual and hostile situations, it also occurs much more widely, as the preceding examples have shown, and it is not a particular balance of fear, aggression or sexual tendencies which forms the common denominator on these occasions. Rather it is the situation 'about to move', particularly from the site. The motivation of sky-pointing is therefore much less obvious than that of the Gannet's agonistic displays, though it probably contains an element of fear.

To sum up, the observations show that sky-pointing does not have a marked appeasing function, but is, if anything, more attack-provoking than other movements. It is possible, though not proven, that sky-pointing functions as an intra-pair signal movement facilitating change-over.

Derivation

It seems likely that sky-pointing is a ritualised flight intention movement. Whilst many geese show neck lengthening before flying up, some have incorporated chin lifting movements and lateral head shakes (Johnsgard 1961). It is not difficult to see how progressive elaboration of a simple neck lengthening could produce the sky-pointing posture. The peculiar rotation of humeri now associated with sky-pointing could be an intention movement of flight adapted to a restricted take-off position (it does not occur so markedly in the boobies which correspondingly nest much less densely). Whilst the Gannet appears to have retained and elaborated sky-pointing in this phylogenetically primitive context, all other Sulidae have transferred it to an entirely different one, that of male advertising. In this functionally emancipated context it has undergone great elaboration different in each species.

COMFORT BEHAVIOUR

Two forms of head shaking and preening fall under this heading.

Rotary head shake (fig. 15, plate 42b)

Most birds shake and settle their plumage after bathing, dust bathing, preening or other disturbance of their feathers such as through being handled. Gannets, however, rotary head shake frequently and regularly (not merely after cleaning activity) in the breeding colony, frequently on the sea after alighting and bathing and almost invariably in the air just after take-off, when they shake themselves strongly and waggle their tails.

During rotary head shaking, the neck is stretched forwards and upwards at about 45° and the tongue bone may be depressed, imparting a peculiar facial expression. The wings are flapped vigorously with increasing speed, the neck and head feathers ruffed out (fig. 15a, b, c) and the head rotated vigorously several times around the horizontal axis, turning the crown until it almost faces the ground (hence the name). The wings are then closed, neck retracted, tail waggled sideways and wings shuffled on the back. The forward thrust of the head with elongated neck and the vigorous flapping make this behaviour particularly conspicuous in the Gannet. In a common variation the body feathers are loosened and shaken with loosely held wings and head rotations—like a dog shaking. Apart from this and other slight variations—the amount of wing flapping, etc.—the Gannet does not apparently use any other movement to shake its plumage, although the ordinary head shake is almost always elicited by a soiled bill.

Rotary head shaking is clearly concerned with resettling the plumage as part of the bird's regular feather maintenance behaviour. It occurs whenever the plumage is disarranged—in the female after copulation,

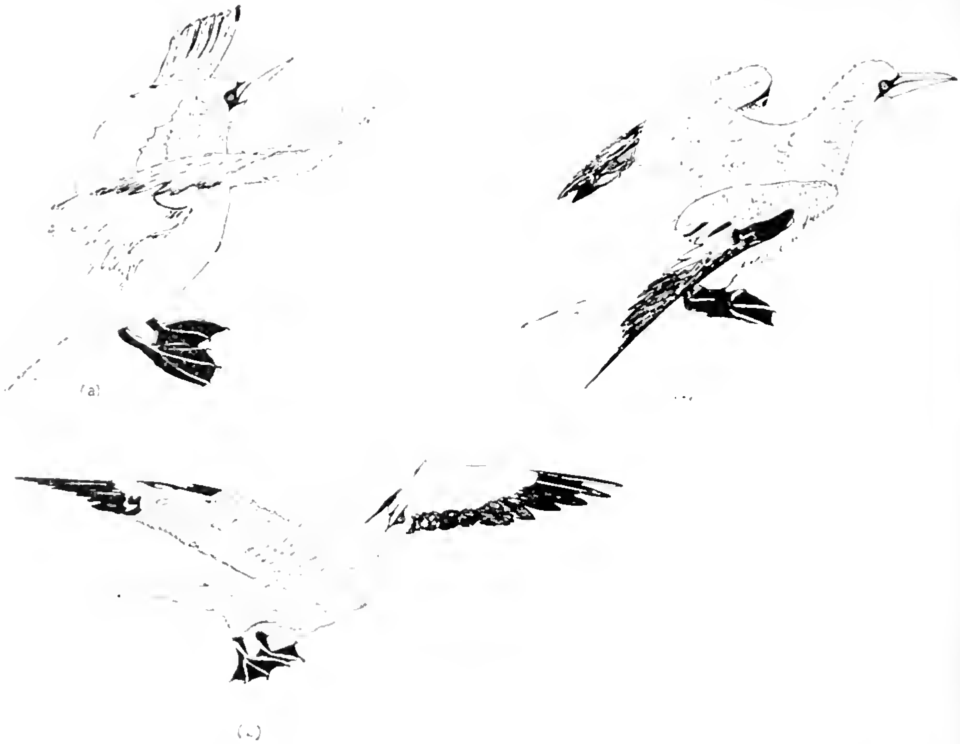

FIG. 15. (a) The wing flapping stage of the rotary head shake, a comfort movement by which plumage is adjusted. (b) The head is rotated vigorously several times. (c) The loosened plumage is shaken strongly

and after preening, fighting and so on. The period of body feather moult, marked on fig. 16, coincides with a peak in rotary head shaking activity; the behaviour can be seen to dislodge old feathers.

Tactile stimulation often causes rotary head shaking. The onset of rain immediately stimulates an outburst comparable to the chick's response of violent wing-exercising which, however, it does without the rotary head shake component. Gannets perform the rotary head shake if soiled by excreta from a neighbour, even if only the foot is dirtied or they merely *see* the excreta fall. The association between seeing excretion and the threat of soiled plumage elicits it perhaps as a conditioned reflex. This kind of linkage may offer a mechanism by which rotary head shaking could become associated with alarm (see below).

Rotary head shaking and alarm. Fig. 16 shows the seasonal pattern of rotary head shaking activity which is high during moult and also towards the beginning and end of the season. At both these latter times the birds are uneasy on land and subject to sudden frights, and rotary head shaking is strongly and positively correlated with alarm. Gannets leaving the colony in alarm cause an outburst of this behaviour among the remainder. The effect of alarm was demonstrated by counting the

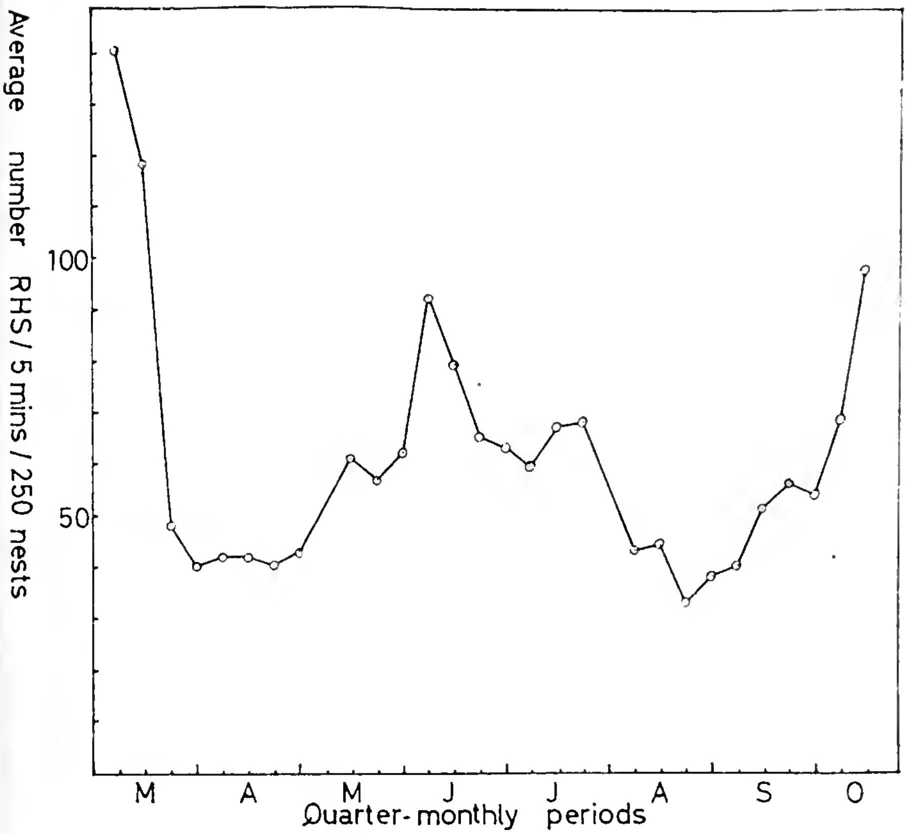

FIG. 16. Seasonal frequency of rotary head shaking, based on 261 five-minute counts in 1962. This behaviour pattern becomes more frequent during moult

frequency of rotary head shakes within a group and then flushing gulls near-by, without allowing the Gannets to see the cause of the disturbance. The clamour alarmed the Gannets and rotary head shaking shot up to many times the previous level before gradually waning. There are at least two possible interpretations of this situation.

First, rotary head shaking following alarm may be necessary to prepare plumage for flight. Some geese, for example, incorporate a similar movement with their pre-flight neck-stretching (Johnsgard 1961). However, the Gannet normally performs a vigorous rotary head shake in the air after take-off (even if it has previously done so on land) and this should make any feather adjustment necessary for flight. It might be suggested that rotary head shaking results from feather sleeking, itself a pre-flight phenomenon and likely to occur in alarmed birds. The rotary head shake might then be a response to tactile stimulation from 'tightened' feathers in birds which did not fly and needed to restore their plumage to the normal condition by loosening and adjusting them. However, any *functional* link between rotary head shaking and take-off remains undemonstrated.

Second, the conflict situation arising from the tendency to flee

induced by alarm and the counter-attraction exercised by the site could result in rotary head shaking as a displacement reaction. This does not suggest why rotary head shaking alone should be the behaviour pattern shown. However, a wing-rattling movement, but without a rotary head shake component occurs in several of the Sulidae as an intention movement of flight. In the Gannet the whole movement has become more elaborate (prolonged and conspicuous flapping) and the entire sequence including the rotary head shake retained apparently both as an alarm or intention movement and as a comfort movement; the boobies use wing-flapping as a comfort movement, but usually without the rotary head shake. The enhanced value in communication achieved by this may again be correlated with the Gannet's dense nesting and aggressive habits, which put a premium on clear social signal behaviour.

Since rotary head shaking is correlated with the tendency to fly, it is not surprising to find that it is also strongly correlated with sky-pointing, which itself precedes movement. Sky-pointing birds tend to flatten their plumage, which could provide peripheral stimulation and thereby cause rotary head shaking in the way proposed above. Since sky-pointing is so strongly linked with flight preparation, the correlation between flight and rotary head shake will generally occur through this link.

It seems justifiable to regard rotary head shaking in all cases (except perhaps its occurrence as a possible displacement reaction to alarm) as a response to some form of peripheral stimulation probably acting via the feather follicles. Thus, whether it occurs in response to rain, excreta, soiled or disarranged plumage or simply feather tightening, it may be referred to the same general causal situation. It *need* not be functional in the alarm situation in the sense of preparing the feathers for flight.

Sideways head shake

The ordinary side to side head shake, one of the commonest movements the Gannet performs, is of interest because it has been incorporated into several functionally distinct displays. Unlike the rotary head shake, the head is held normally and not aligned with the neck, so that the movement seems to be between the base of the skull and the articulating neck vertebra; in the sideways head shake only the head moves, whereas in the rotary head shake the head and neck seem to move as a single unit.

A similar head shake occurs in Herring Gulls, Kittiwakes, Guillemots and Shags, and doubtless many other birds. It displaces water from the head, the secretion of the salt gland from the bill and so on. In the Gannet it is much commoner than in the above species and occurs in several social situations, alone, or as part of more complex behaviour such as the bow.

The following summary shows the occurrence of the head shake in all its modified forms:

(1) Violent head-flinging is used to dispel strongly-adhering matter from the beak. With mandibles widely parted, it is also used to dislodge fish bones and similar objects from the throat. Spilt fish, egg-shell remnants and stones from the nest cup are all dispelled with this movement.

(2) As a probably non-signal part of threat behaviour, vigorous head shakes are interspersed throughout menacing matches, together with pelican postures and nest touching movements.

(3) The sideways head shake is 'locked' in the bow and occurs after each dip. In the male's advertising display (resembling an inhibited bow), the head shake component is very conspicuous whilst the dip is suppressed. Head shaking is one of the main components of mutual fencing, but differs in form from ordinary head shaking and resembles rather more an attempt to maintain contact with the other's bill during irregular side to side movements, though its resemblance to head shaking can be seen when the partner's bill is momentarily out of reach.

(4) Females use a very inhibited head shake when reacting to the presence of a male near-by which they want to attract. Both sexes also react to the voice of their incoming mate by rapid head shaking. An exaggerated form of head shaking is also used by the female as a ritualised signal in soliciting copulation. The head is held loosely and flung violently from side to side. The female usually squats, with head held low, and continues the movement intermittently during copulation.

By contrast to the wide occurrence of ordinary head shaking, rotary head shaking is confined entirely to a few situations. In none of the situations described above, with the possible exception of the first, does the Gannet use a rotary head shake.

Why should the one form have been selected for incorporation into signal displays whilst the other occurs mainly in one context (soiled, wetted or disarranged plumage) and not as a signal? Possibly because in some contexts (e.g. menacing) a rotary head shake would temporarily obscure vision, and in others (e.g. copulation or mutual fencing) would be physically inconvenient. Also the sideways head shake is a simpler movement and therefore more likely to be 'preferred', other things being equal. It may be that the ordinary head shake was more suitable for exaggeration and change.

Clearly one can say little about the function of the head shake in its emancipated form, since it usually occurs as part of a complex behaviour pattern. I have the strong impression, however, that it has non-hostile overtones in many situations. A head shaking bird is very likely to be slightly afraid or friendly, rather than aggressive.

In summary, the sideways head shake in the Gannet is a good example of a simple basic movement which nevertheless shows wide variation in form, context and function in its incorporation into complex displays.

Preening

Gannets preen thoroughly for much of their long periods of site attendance. After bathing, the complete preening procedure, includ-

ing oiling, is performed on the water. The ventral surface is exposed by rolling on to one side. A curious difference within the family is that, whereas *S. dactylatra* does not roll in this fashion when bathing, both *S. nebouxii* and *S. variegata* invariably do so. Gannets also occasionally preen in flight. They do not wing-dry like Shags, Cormorants and pelicans, nor adopt special sunning positions like other members of the family.

Whilst a detailed study might reveal a pattern of preening different parts of the body, it is not readily apparent. Gannets switch abruptly from one part of the body to another. The remiges and rectrices are drawn separately between the mandibles and the tail is sometimes bent sideways at right angles to the body to help this. The thick quilt-like body plumage is nibbled with the points of the mandibles, and the lower breast and flanks are 'stropped' with a sideways motion of the bill. In a thorough preening session, which may last for over an hour, the oil gland at the base of the tail is erected (the feathers surrounding it can be displaced to uncover the gland), oil is rubbed on to the nape and back of the head and then rolled on to the back and wings from the head.

Preening is occasionally followed by direct head scratching in which the pectinated middle claw is mainly used.

Perfunctory preening often follows other activities. The area preened is often decided by postural facilitation. Following bowing, the bill tip rests on the upper breast and this region is most frequently preened then. Also preening occurs at a specific point in the behaviour sequence following a fight or a bout of menacing. As the tension gradually relaxes the first non-hostile behaviour, apart from head shaking, is invariably a rotary head shake and then short preening bouts. The preening can be seen to arrange the plumage which is often soiled and disordered.

Sleeping

Adult Gannets, including incubating birds, sleep with heads tucked in scapulars. The bill is dexterously inserted between the feathers and the head is almost entirely covered. Much of the time on the site is spent sleeping, particularly during wind and rain. They occasionally doze with bill forward, but never sleep properly in this way. They tend to sleep much more in the last hour of daylight (and presumably also at night), but otherwise show no periodicity. Unlike Shags, Gannets do not usually rest side by side on the nest; if one sits, the other stands. There is no precise point in time at which the female 'takes over' the centre of the nest, though she does so before egg laying.

After an exhausting fight Gannets invariably fall into a deep and prolonged sleep, no doubt part of the necessary recuperative process and possibly comparable to battle fatigue in soldiers. I have several

PLATE 48. Thekla Larks *Galerida theklae*, Portugal, May 1963: very similar to Crested Larks *G. cristata*, but just separable on bill size, breast markings, underwing colour, voice, gait and behaviour; the breast markings extend to the nape and the erected crest forms a fan, not a spike (pages 337-341) (*photos*: *E. N. H. P...*)

PLATE 49. First-autumn Citrine Wagtails *Motacilla citreola*, Suffolk, October-November 1964 (above) and Finland, September 1964 (below). Note the grey upperparts and short white-edged black tail, pale supercilium, and broad-edged tertials and double wing-bar (pages 344-346) (*photos: H. E. Axell, and S. and T. Vuolanto*)

PLATE 50. Tawny Owl *Strix aluco* mobbing Arthur Addicott posed at the foot of the tree in which it had a nest, Somerset, May 1964. This bird used regularly to attack him each evening when he came within fifty yards of the nest, knocking off his cap and once cutting his head (pages 343-344) (*photo: Malcolm Parsons*)

PLATE 51. Papillomas on the feet of Chaffinches *Fringilla coelebs* from north Germany and London (above) and on the foot and head of one from Surrey (below). These rough, brownish-grey growths covered the metatarsus and one or more toes of one foot only (see above right) in each case (pages 346-347) (*photos:* R. *Hood*)

times caught by hand Gannets sleeping on the fringe of the colony following a fight and have records of such birds sleeping almost continuously for three days.

PELICAN POSTURE (fig. 17, plate 46a)

This has already been discussed as part of bowing. The following is an account of it in all other situations.

In this posture the bill tip is pressed into the upper breast, centrally or to one side, resembling the resting position of a pelican. This position may be held for 20 seconds or more before the bill is lifted slowly and carefully as though the bird were striving to avoid sudden movement. In some situations the slow bill-raising accompanies an equally slow turning away from an opponent. An obvious comparison is the deliberate foot-raising used when Gannets move in the sky-pointing position. The same slow foot-raising sometimes occurs in conjunction with the pelican posture. In one aggressive encounter with a neighbour, a male withdrew in this extremely cautious manner and, when clear, suddenly dashed back to his site and attacked his mate. When a Gannet moves in the pelican posture it does so slowly and with wings busked as in sky-pointing. It never moves in a pelican posture with wings held out sideways as, for example, in the extreme bow position. Nor does it run in a pelican posture.

Pelican postures occur regularly in most ambivalent agonistic situations, including those in which fear is stronger than aggression and vice versa.

Pelican postures occur in the aggressive bird during and following aggression of male to female (redirected aggression, aggressive copulation, the new-pair situation, the eviction of unwanted females or adult attacks on chicks) or of either sex to some other species (e.g. Herring Gull whose territory is invaded). In the first-named examples the posturing bird is almost purely aggressive.

Hostile behaviour from neighbours, elicited in a variety of ways

IG. 17. Pelican posture. This usually follows bowing and also occurs separately a variety of situations; it is motivated by fear/aggression and probably appeasing in function

(landing badly, establishing a site among established pairs, blundering through the colony in an attempt to take off), produces prolonged pelican postures from the bird threatened or attacked. A male landed in the fringe and performed a deep pelican posture; he was startled by another Gannet flying overhead, flinched and assumed a deeper pelican posture; he came out of the pelican posture, was menaced and assumed another deep pelican posture. This series of pelican postures as reactions to threat stimuli is characteristic.

Whilst the above instances *probably* involve ambivalent motivation, a number of situations clearly evoking both fear *and* aggression also elicit the pelican posture. Thus it frequently occurs in evenly-matched aggressive encounters between site-establishing birds; in birds displacing intruders (with, in many cases, strong possibilities of resistance); in birds trespassing to attack a chick or approach a threatening female. In all cases there is an obvious source of both fear and aggression. Gannets landing on their empty sites are aggressive but also elicit threats. They show marked pelican postures, during which (as their conspicuous eye movements show) they scan the neighbours. In all these situations it occurs whilst the bird is relatively safe from attack, not during it.

In all the above examples the Gannet performing the pelican posture is therefore (a) mainly aggressive but at the same time trespassing and slightly afraid of retaliation, or (b) mainly afraid but attempting aggressively to maintain its site, or (c) evenly balanced, as in reciprocal menacing bouts.

Finally it may be added that neither site, mate, the near presence of any other Gannet nor the performance of any specific behaviour pattern are necessary to evoke a pelican posture. It may be suggested, however, that a specific direction, or perhaps rate of change in the proportions of contributory tendencies could be necessary, for it is precisely where considerable fluctuations in motivation are occurring that the pelican posture is performed.

Since the pelican posture often occurs in situations 'requiring' an appeasement posture (and looks like one), the possibility that this is in fact its function should be considered. Since most bird species fight with their beaks, the pelican posture clearly fulfils one requirement of an appeasement posture—that the weapon of offence should be held in a position markedly different from that used in attack. It is therefore not surprising to find that, for example, the Kittiwake, in which the bill sharply focuses attack (Cullen 1957), has convergently evolved a bill-hiding appeasement posture. Despite the fact that the pelican posture occurs in such a wide variety of situations, and includes aggression beside fear, the most fitting interpretation of function is that it tends to reduce the likelihood of attack or retaliation and is therefore an appeasement posture.

It is difficult to measure the efficacy of the pelican posture; it often fails to prevent attack or retaliation and certainly does not stop attacks already launched, nor does it necessarily inhibit the performer from attacking, though it clearly removes the bill away from an antagonist whilst at the same time maintaining full readiness to retaliate. It seems unlikely to function in protecting the eyes (see page 243) and does not remove the potential attacker from the visual field of the bird performing the pelican posture (*cf.* the 'cut-off' theory of Chance 1962).

It is, however, restricted to the above situations. Appeasement postures elicited in other situations (e.g. male aggression to a female) are different in form. It may be significant that these situations mainly lack the aggressive motivation which may be necessary to evoke the pelican posture.

As already mentioned under bowing, the pelican posture is probably derived from the infantile appeasement behaviour of 'beak-hiding'.

This completes the survey of Gannet behaviour at the breeding colony, with the exception of parental care and the development of chick behaviour, which it is hoped to treat separately; the main emphasis of this paper has been on social communication behaviour in the wider sense.

DISCUSSION

Although the connection between aggression and the site seems clear from the evidence discussed and it has been possible to demonstrate the unity of several different measures of site attraction, including sex differences in the site-ownership display, site attendance and site tenacity, the correlation must be considered seriously incomplete until a convincing reason for the evolution of such intensely competitive behaviour can be suggested.

The supply of suitable nest sites is not strictly limited at present (a) because at many large gannetries there is still room for substantial population increase and (b) because, taking into account the Gannet's ability to use flat ground as well as cliffs, the number of potential gannetries is very large.

Accepting for the moment that Gannets evolved their social behaviour, including violent aggression, under the selective conditions of cliff-nesting, which I believe was the ancestral habit, we may then suppose either that the supply of suitable cliff sites (such as broad ledges and broken cliff faces) was at one time strictly limited in proportion to the Gannet population or that, despite plenty of physiographically suitable sites, there was perhaps a strictly limited number of sites suitable in *all* respects. In other words, that there was some other good reason for crowding closely together and hence adding a new and advantageous dimension to site choice and competition.

It is hard to believe that the British Gannet population could ever

have saturated all suitable stacks and islands. With regard to the second suggestion, since the criterion for full suitability is not whether a site allows simply success or failure, but what *probability* of success it confers compared with other sites, we can imagine social requirements which must be met. Evidence for differential breeding success in birds from sites with different social characters, though comparable with respect to topographical features and age and experience of adults, would help clarify the point. At present my records show an effect of density in advancing the onset and increasing the synchronisation of laying, but not on breeding success *per se*. Also, I have no data on the survival to *breeding age* of young from different times of the same breeding season; perhaps late young survive less well. Such an effect, if present, would provide one factor inhibiting, though by no means preventing, the use of sites lacking in nearness to others and perhaps to many others if a high density is necessary to produce optimal synchronisation and ultimate survival of young. The effect of social factors could well be far more complex, but in the absence of evidence enough may have been said to suggest that, even in the presence of topographically suitable sites, competition for strictly limited, 'totally' suitable sites could conceivably occur and so provide a sufficiently important reason for the evolution of the aggression we observe.

The social stress resulting from fiercely competitive behaviour seems the sort of mechanism which might be interpreted according to Wynne-Edwards's (1962) ideas on the factors controlling the admission of new breeders to a colony. It cannot be doubted that every new would-be breeder in a Gannet colony must survive frequent and often severe challenge and it is conceivable that immature birds are in some way 'inferior' and might be prohibited from breeding under such circumstances. The phenomenon of the adult non-breeders present with immatures on the Bass and yet apparently not prevented from breeding by shortage of sites could then be explained. One of the inadequacies of this interpretation is that (as shown by the three annual extensions of the observation colony) there are no fixed or 'conventional' limits to the colony within which new breeders must find a place or be expelled by older and socially superior members. There is, it seems, nothing to prevent new breeders from settling in the fringes, near to existing nesters but not in direct competition with them. A fuller discussion of this problem turns primarily on ecological factors and is being considered elsewhere. There is no convincing evidence one way or the other for the correlation between strong competition and strictly *limited* nest sites in the Gannet. Yet the competition is indubitably there and if we are to justify its presence in evolutionary terms, remembering its attendant disadvantages, an important function must be found. The site is clearly the object of competition, but the deeper reasons behind site conflicts remain to be found.

The dense colonial nesting and strong aggression require clear-cut signal behaviour to ensure adequate communication between members of the community. Correspondingly, Gannet displays are numerous, strongly differentiated and conspicuous. Throughout them all, the determinative influence of aggression can be traced.

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SUMMARY

(1) Gannets *Sula bassana* were studied intensively on the Bass Rock, Scotland, from 1960 to 1963. Particular attention was paid to behaviour in a group of about 250 pairs containing many colour ringed adults. The importance of aggression in Gannet breeding behaviour is stressed in the introduction.

(2) Morphology, including sex differences, and voice are briefly described. Males tend to have yellower web lines and darker buff heads than females.

(3) A brief synopsis is given of some important aspects of Gannet breeding biology outside the scope of this paper.

(4) The process of site establishment in the Gannet is described in detail. Gannets breeding for the first time tend to return not only to the natal colony, but to the local part of this from which they fledged. They usually maintain a site for all or part of the season prior to first breeding. Different types of site acquisition are described. Full details are given of the severe aggression involved in site acquisition; the differences between male-to-male, male-to-female and female-to-female aggression and other forms of aggressive but non-fighting behaviour (menacing and bowing). The latter, an aggressively motivated display signalling site ownership, is analysed in detail. Site attendance in different categories of site owners is described and the sex difference in attendance analysed.

(5) Pair formation and the pair relationship are described. Males advertise by a special display derived from the aggressive site ownership display, bowing. Quantitative figures for its effect are given.

(6) In relation to pair formation and the pair bond, females show appeasing behaviour, 'facing away', and the pair perform a meeting ceremony, 'mutual fencing'. The latter is analysed in some detail, and it is shown that the length and intensity of mutual fencing bouts are correlated with the amount of aggression, particularly in the male, which has to be 'overcome': the more aggression, the longer and more intense the mutual fencing.

(7) Later stages in the pair relationship are described and the male's continued aggression towards his mate stressed. Gannets usually mate for life: 78% of pairs

followed for four years remained together throughout, 5% remained together three successive years and the remaining 17% stayed together two successive years. It was further shown that, irrespective of mate attraction, there is also a strong site attachment in both sexes, though demonstrably stronger in the male, in which, in fact, it could account for *both* site and mate attraction. In other words, site fidelity *alone* was 94%, compared with virtually the same figure (96%) for site-plus-mate fidelity, in which the attraction of the female could have played a part in attracting him back.

(8) Mutual preening frequently occurs in mated pairs and also in temporary associations between 'club' birds; females tend to preen males more than vice versa.

(9) Copulation behaviour is analysed in terms of seasonal frequency and associated behaviour patterns. It reaches a peak about two weeks prior to egg laying and there is a high individual rate. Successful copulations are distinguishable by the male's behaviour. The proportion of successful ones rises prior to egg laying. Reverse copulations are extremely rare, though both sexes attempt copulation with well-grown young. Copulation stops abruptly after egg laying, but restarts within 24 hours of egg loss, even after lengthy (up to 32 days) incubation.

(10) Nest material is gathered assiduously between January and October, but prior to egg laying by the male only. On the Bass more grass than seaweed is used. Rain elicits outbursts of building. The habit of directing the excreta onto the sides of the nest is significant in enabling Gannets to cement their nests on to sites which would otherwise be untenable. Nest building and nest maintenance movements are described.

(11) Incubation behaviour is less efficient in first time than experienced breeders. Egg-donation experiments showed that some Gannets will accept eggs prior to laying their own; others reject them. Of birds which laid subsequently, those which accepted the foster eggs were closer to laying their own than were those which rejected them. Incubation tendency is closely linked with the deposition and presence of an egg and quickly wanes in its absence. Egg retrieving ability is very limited.

(12) The conspicuous behaviour 'sky-pointing', in which the neck is lengthened and the bill pointed skywards, is analysed. It is basically a pre-movement display, used particularly before movement away from the nest. Others have suggested that sky-pointing is appeasing behaviour enabling the bird to make its way unmolested through nesting ranks. The evidence given here refutes this. One important function is probably to synchronise change-over, by signalling impending departure. This interpretation makes more sense of sky-pointing in the cliff habitat, where take-off is easy.

(13) The rotary head shake is a conspicuous and common comfort movement. Basically it is probably a response to tactile stimulation, including soiled or wet plumage or tightened feathers. It is closely linked with sky-pointing and alarm. The reasons for this are discussed.

(14) The simple sideways head shake, a movement which the Gannet has incorporated into many displays, is described in its various contexts.

(15) Preening and sleeping are discussed.

(16) Gannets frequently show a pelican posture, in which the bill is partly hidden by tucking it medianally against the upper breast. Pelican postures are elicited by ambivalent aggression/fear motivation and probably function as appeasing behaviour.

(17) The discussion deals with the evolutionary significance of site competition in the Gannet, in which its outstanding aggression is presumably functional.

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Studies of less familiar birds

135. Thekla Lark

By D. I. M. Wallace

Photographs by A. N. H. Peach

(Plate 48)

In a previous article in this series, accompanying some photographs of the Crested Lark *Galerida cristata* by Ib Trap-Lind, Ferguson-Lees (1962) drew attention to some of the differences between that species and the very similar Thekla Lark *G. theklae*. As the problem of their separation in the field is likely to confront anyone visiting Iberia or north-west Africa, the publication now of two photographs of the Thekla Lark in Portugal in May 1963 is most welcome. It may be that very little difference will be immediately obvious between these and the photographs of the Crested Lark published in 1962, but this only serves to emphasize the problems discussed below!

Considering the continuing struggle to sort out the systematics of the genus *Galerida*, it comes as rather a surprise to find that the Thekla Lark was originally described as a separate species in 1858. During the next sixty years it was frequently denied that rank, but nowadays it is normal to accept it and the Crested Lark as sibling species, both markedly polytypic. Voous (1960) expressed the opinion that the Thekla is probably of the Mediterranean faunal type, though the isolated populations, each of a separate race, found in Ethiopia, on the Somaliland plateau and in the Huri Hills in Kenya point to a dramatic shift in its range at an early time in its history. Its present distribution lies mainly between the July isotherms of 77° F and 90° F, spanning parts of the Mediterranean, steppe and savannah climatic zones and overlapping considerably the range of the Crested Lark (see fig. 1).

In over half its range the Thekla inhabits rather similar country to that occupied by the Crested and so a clear difference in habitat preference might be expected. However, these sibling species refuse to be straightforward. Thus, while it may be said generally that the Thekla prefers broken, sloping ground (tolerating a fair growth of vegetation) and that the Crested chooses flat, barren plains (disliking the presence of bushes), this is a considerable over-simplification. On the Costa Brava of north-east Spain, the Thekla is widely distributed on the undulating rock- and scrub-covered plateaux which run back from the sea cliffs and intersperse the alluvial farmland and coastal sand dunes that together form the exclusive habitat of the Crested. Every year from 1960 to 1964 British observers have found their breeding ecology unchanged and the two species seem to have accepted as a 'no man's land' the steep, usually wooded slopes that connect the two habitats.

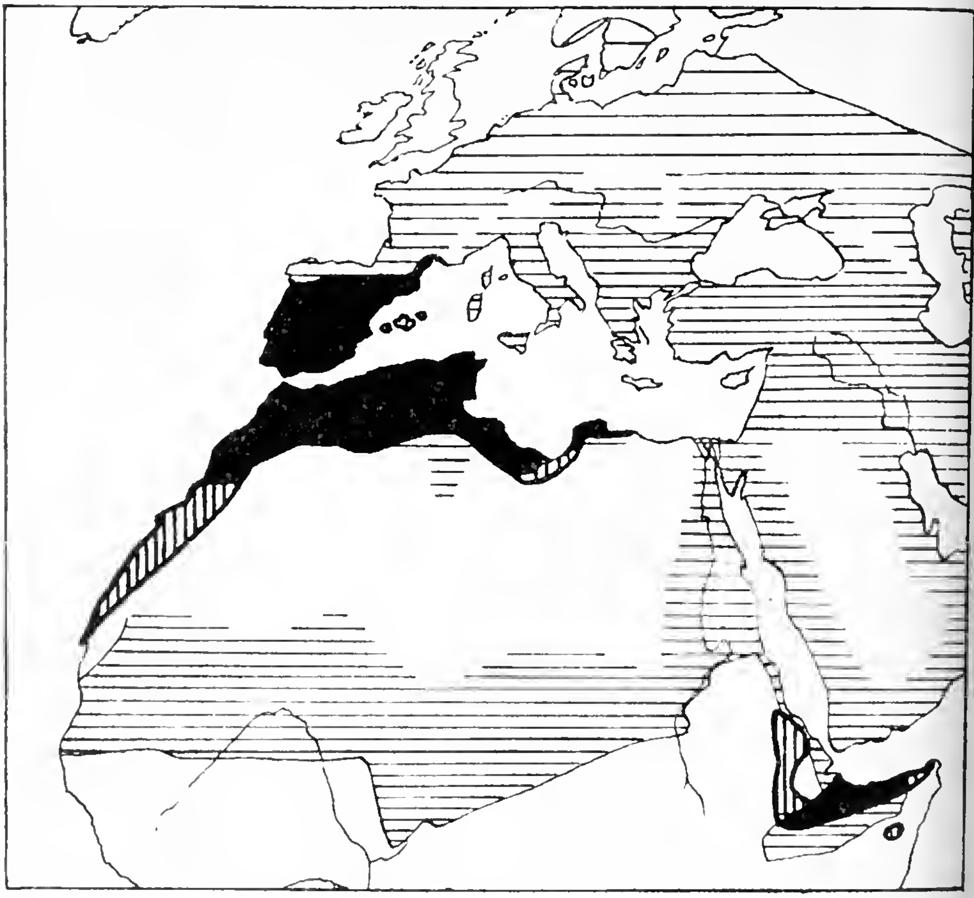

FIG. 1. Distributions of Thekla Lark *Galerida theklae* and Crested Lark *G. cristata* in the western Palearctic and northern Ethiopian regions (after Abs 1963, Voous 1960, and Mackworth-Praed and Grant 1953). Solid black areas indicate the presence of both species, vertically hatched Thekla alone, and horizontally hatched Crested alone

In Andalucia, however, and even where similar habitats to those noted above are repeated, their preferences are much less distinct. There the Crested is certainly alone on level, open farmland, around salt-pans and marisma edges between the Bay of Algeciras and the River Guadalquivir, but the Thekla is quickly dominant where the ground becomes stony and broken (sometimes occurring within a few feet of sea level) and in 1961 I found that there appeared to be a narrow area of overlap in marginal cultivation. In view of its relatively restricted distribution compared with that of the Crested, it seems odd that the Thekla should show a greater flexibility in its choice of habitats and also be locally more abundant, but there is little doubt that this is the situation in the two areas of Spain discussed above (see Ferguson-Lees 1962: 38-39 for further comment). Furthermore, Pasteur (1958) considered the Thekla to be, after the House Sparrow *Passer domesticus*, the commonest bird of Morocco.

Separating Thekla from Crested Larks in the field is not easy, the morphological pliability of both species being such that the burden on the observer is not only considerable but of varying complexity. Characters that serve to distinguish them in one part of their common range become useless in another and, worse still, certain populations of Crested Larks, for example those at the north end of the Dead Sea, look at first sight more like Theklas than Theklas themselves! Here there is space only to mention the characters proven useful in Iberia and north-west Africa.

The Thekla Lark is a smaller, slighter and lighter bird than the Crested with shorter and narrower wings, but the only structural character of real value in the field is the bill. In the Thekla this is distinctly less pointed and shorter than in the Crested, the difference in the average bill length of the two species' Iberian forms being over 10%. The stouter appearance of the bill is one of the features that give the 'face' of a Thekla a different, less fierce-looking expression than that of the Crested. Turning to general character, I have always regarded the Crested as a bird with a characteristic shuffle when moving on the ground; often it shows only the lower part of its tarsi below its loose flanks. Abs (1963) also commented on this short-legged appearance and added specifically that the Thekla has a relatively more erect gait in which the tarsi are fully visible. He developed this point by stating that, while the movements of the Crested are reminiscent of those of a Starling *Sturnus vulgaris* and include a characteristic stooping halt, those of the Thekla are quicker and more nervous and include a normally upright halt posture.

With regard to plumage, the best character with a bird on the ground is the pattern and strength of the streaks and spots on the chest and sides of the neck. These markings are much more obvious and extensive on the Iberian Thekla than on either the typical or the Iberian race of the Crested, their prominence being heightened by the usually cleaner tone of the Thekla's underparts (contrast plate 48a with *Brit. Birds,* 55: plate 7). Furthermore, the broad gorget of dark spots continues round the neck of the Thekla and *on to the nape*, thus becoming part of the pattern of blackish feather centres on the upper-parts. These dark centres can be much more obvious on the Thekla than on the Crested, the difference being quite clear in the populations on the Costa Brava in north-east Spain. It is, however, less distinct in the populations in Andalucia in southern Spain and would be probably of no value where local Crested are more strongly marked themselves, as in parts of north-west Africa. Abs (1963) made several other interesting points. These included the mention of a distinct contrast between the back and upper-tail coverts of the Thekla and the remarkable observation that the crest of the Thekla, when raised, appears as a full complete fan of feathers whereas that of the Crested consists of

fewer, isolated feathers and forms a spike rather than a crest. On the value of the first point I cannot comment in retrospect, but the second does ring a bell and gains at least some support from plate 48b (contrast with *Brit. Birds*, 55: plate 6). Finally there is the important difference in the underwing colour. In the Thekla Larks of Spain, Portugal and north-west Africa this is grey (in some lights even silvery) and not orange-rufous as it is in the Crested Larks of the same regions. To see this character takes time and a certain amount of cunning, but it is usually possible to manoeuvre a 'crested lark' into a position in which the sun will illuminate the underwing as the bird takes off. The effect of these underwing colours is to make a Crested appear to glow warmly in flight while a Thekla remains more uniformly dull.

Faced with such a list of relative field marks, it is a relief to be able to state that the two species do exhibit some differences in voice. Though their calls and songs have in the past confused as many ornithologists as their similarity in plumage, the recent and exhaustive study by Abs, illustrated by sound spectrograms, indicates clearly that, at least in the case of the individuals that he recorded, the Thekla's song and whole vocal range were less plastic and more restricted than those of the Crested. This view has been taken by a number of British ornithologists who have listened to Thekla Larks in Spain over the last ten years. Birds on the Coto Doñana were described as having voices in general less musical than Crested. In particular, their song phrases were noted as briefer, harder or more metallic, possessing a scratchy or brittle quality and containing few of the rich, fluting notes so characteristic of the Crested's song. These differences were also noted on the Costa Brava where, in addition, it was thought that Theklas included fewer bell-like notes. Turning to calls, most observers are also agreed that the Thekla's version of the Crested's well known whistle (a contact or alarm call) is less loud and shrill. Guichard (1963) went even further in regarding the difference between these calls as diagnostic, writing that of the Thekla as *tu-ti* or *tu-ti-hi* and describing it as very clear, high-pitched and musical. The Theklas that Guichard studied were on the Côte Vermeille, part of the French sea-board close to the Costa Brava. In 1960 my attempt at writing the whistle of the Crested Lark in the latter area was *klee-tree-weeoo*, a clear, ringing phrase usually of four syllables. Another characteristic note of the Theklas on the Coto Doñana is a monosyllabic *brit*.

The breeding biology of the Thekla has not been studied as fully as that of the Crested, but the information available indicates a close similarity in various aspects. The nest form and site appear to be the same—a cup of dried grass, roots or weeds placed close to a plant affording some cover and shade or actually interwoven into it. A photograph published by Niethammer (1955) indicates that occasionally nests constructed in the latter fashion reach a considerable size,

though Abs stated that in general they are usually smaller structures than those of the Crested. Fresh eggs may be found in Spain, Portugal and north-west Africa from February to June. The clutch size is extremely variable: any number from two to seven has been recorded though it appears that three or four is the most usual. In appearance the eggs are fairly distinct, being basically greyish or yellowish-white in colour, overmarked with both pale ashy-grey and dark olive spots and flecks, and resembling the eggs of the Woodlark *Lullula arborea* rather than those of the Crested. Details of the periods of incubation and parental responsibility were said to be unknown by Abs, though he did state that the nestlings spend nine days in the nest and a further six in ground cover before attaining the power of flight.

With regard to the food spectra of the two European *Galerida*, Abs gave some fascinating information on their spring diet in Spain and demonstrated a clear difference which indicates a quite separate ecology. In the case of the Thekla Lark he found that seeds and grains made up 93% and insects 7% of its food. For fuller information on this and many other aspects of the biology of these species, enthusiasts are referred to Abs's paper.

I am grateful to P. J. Conder for allowing me to include his comments on the voice of the Thekla Lark with my own.

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Notes

Goldeneye diving into water from the air.—On 19th December 1964 an organised shoot was taking place at Blagdon Lake, Somerset, and I stationed myself on a dam at the west end of the lake to keep a watch on the movements of wildfowl. The level of the water was low, shooting was from strategically sited butts on the exposed margins of the bed of the reservoir and rowing boats were being used to keep the ducks from settling in areas that were out of range.

Eventually a mass of duck came flying in to alight beside the dam. Among them was a drake Goldeneye *Bucephala clangula* which, instead

of pitching on to the surface as I expected, swung rapidly and with flexed wings plunged directly into the lake at an angle of about 60° and from a height of some 15 feet. He remained submerged for several seconds and then resurfaced, but guns were being discharged all the time and so he dived nervously again and again, often in a flurry. At first I thought that he had been winged, but some minutes later when a boat came round he took to wing and flew a normal course towards the far end of the lake. MICHAEL KENDALL

Montagu's Harrier with leucistic plumage.—On 15th May 1965, in Hampshire, we together came across an extremely light-plumaged female Montagu's Harrier *Circus pygargus*. She was so pale that we did not know at first what we were looking at, but a small but distinct white rump patch helped to give us the answer. From closer range, at a distance of about a hundred yards, we could see that the background colour of the whole bird was creamy with 'darker' markings of light buff and a small but distinctive square of broken, brownish streaks on the under-side of each wing near the rear edge and not far from the body. The eyes were normally coloured and probably also the bill and legs. BERNARD KING and J. C. ROLLS

[Bryan L. Sage, author of the paper on 'Albinism and melanism in birds' (*Brit. Birds,* 55: 201-225), has commented as follows: 'This appears to be a case of leucism and as such is unique for this species. The only harrier for which I have records of albinism of any kind is the Hen Harrier *C. cyaneus* and there are only two cases of that. It is interesting that a species which has a not infrequent melanistic phase should now provide an instance of albinism.'—EDS.]

Kestrel apparently 'selecting' partially blind Starling from a flock.—On 9th March 1965, on Skokholm, Pembrokeshire, I heard a commotion among a pre-roosting flock of Starlings *Sturnus vulgaris*. On investigation I found a female Kestrel *Falco tinnunculus* standing over a screeching Starling. The Kestrel immediately flew away, but the Starling darted into a hole in the rocks where I was easily able to catch it. It proved to be blind in the right eye from some earlier injury. An adult female of normal weight, it was otherwise unharmed and flew away strongly on release. This would seem to be an example of a predator 'picking out' an abnormal bird from a mass of others. M. P. HARRIS

Lesser Black-backed Gull in same area in successive winters and a case of progressive albinism.—A Lesser Black-backed Gull *Larus fuscus* which is distinguishable in flight by a large white spot about $1\frac{1}{2}$ inches across on the upper surface of its right wing has now been seen

t Winnal, near Winchester, Hampshire, in two consecutive winters. t was first noted on 12th January 1964 by J. M. Cloyne, P. F. Doble nd myself and then on nine more occasions up to 12th April 1964. After an absence of eight months it was seen again on 20th December 964 and twice more in January and February 1965. On 13th March 965 I also saw it at Avington, some five miles to the north-east.

The white spot was sufficiently distinctive for us to be sure that the ame individual was involved, but it is of interest that two primaries n the left wing had also grown white by the second winter. This herefore seems to be comparable to cases of progressive albinism in he Blackbird *Turdus merula* and Chaffinch *Fringilla coelebs* mentioned by ryan L. Sage (*Brit. Birds*, 55: 211-212).

Winnal is a winter resting and feeding area for many gulls of five pecies which in the evening return to the coast to roost.

P. J. PUCKERING

n unusually aggressive Tawny Owl.—Late every evening Arthur ddicott has to walk each way along a drive leading to the University f Bristol School of Veterinary Science at Langford, Somerset. or about three weeks from 28th April 1964 he was regularly attacked y a Tawny Owl *Strix aluco* which had a nest in one of the trees along e drive. It used to mob him up to about 50 yards from the nest site. ormally this took place after dark, but on one occasion it attacked him daylight. It always dived down on him from behind and used to nock off his cap. On one occasion it cut open the top of his head and ter that he carried a box with him as additional protective headgear. ate 50 shows the Tawny Owl mobbing Mr. Addicott at the foot of e tree in which its nest was. This was taken by flashlight at about .30 hours BST on 8th May 1964. The attacks ended after about th May when Mr. Addicott found a young owl in the vicinity, pre- mably indicating that the brood had fledged.

I am grateful to Professor Albert Messervy who drew my attention these happenings and to Malcolm Parsons who took the photograph. W. Tucker in *The Handbook* says of this species, 'Bold in defence of st and will sometimes stoop at and strike head of intruder with its arp talons', and 'Danmarks Ugler', an 8-minute 16 mm. black-and- hite film produced by Statens Filmcentral of Copenhagen, includes me sequences of a Tawny Owl attacking a man, but there seem to be v well-documented cases in the literature and the regularity of the acks upon Mr. Addicott over a period of three weeks is noteworthy.

That the attacks of an aggressive Tawny Owl should not be treated htly has long been evident from the unfortunate experience of Eric sking who lost his left eye to a nesting female which he was trying photograph in Wales in 1937. Mr. Hosking has told me of several her incidents which have come to his notice as a result of this. Some

years ago he met an eleven-year-old boy in Newcastle who had also lost an eye; the boy had picked up a young Tawny Owl from the ground with the intention of returning it to its nest and was attacked by one of the adults. During or just before the war, Dr. S. Long was mobbed by a Tawny Owl at Hickling, Norfolk; his mackintosh was slit along the back, but he sustained no real injury. The late Frances Pitt once had to ward off a Tawny Owl with a stick.

However, it is important not to get the impression that the Tawny Owl is a savage animal which attacks human beings on the least provocation. The fact that instances of attacks are individually remembered and that plate 50 is unique among still photographs, so far as I am aware, serves to suggest that such aggressiveness is probably quite rare. This is borne out by the experience of H. N. Southern who has regularly studied a number of pairs of Tawny Owls in the Oxford area over a period of fifteen years and who has only once been attacked in all that time. JEFFERY BOSWALL

Citrine Wagtail in Suffolk.—At 14.00 hours on 17th October 1964 a first-winter Citrine or Yellow-headed Wagtail *Motacilla citreola* was discovered by H.E.A., P.J.M., C. Cuthbert, D. Mower and P. Muller on the reserve of the Royal Society for the Protection of Birds at Minsmere, Suffolk. It stayed until 14th November and during those four weeks appeared to find an area of newly disturbed wet and dry earth much to its liking. In this open habitat it gave us ample opportunity to obtain detailed field-notes and it was watched by a large number of visitors.

Much more than is usual in the feeding behaviour of Pied Wagtails *M. alba* or Yellow Wagtails *M. flava* in Britain, it frequently searched for food in quite tall and thick vegetation, being lost to view for long periods in large areas of sea-aster and in the edges of reed beds. In wet reed stubble, it was not averse to walking in water up to the tibial feathers. On bare ground, it appeared to stand more upright and seemed longer-legged than a Yellow Wagtail. Whilst it nearly always fed alone, its active running after insects occasionally brought it close to Bearded Tits *Panurus biarmicus*, Rock and Water Pipits *Anthus spinoletta* and Pied Wagtails, but this evoked no aggression from it or the other species.

From the back, especially when it could be directly compared with Pied Wagtails, the wholly pale grey upper-parts and black tail prominently edged with white were like those of a White Wagtail *M. a. alba*, as remarked by the observers of some of the Citrine Wagtails that have been recorded on Fair Isle. It was noticeably smaller, however, with the tail appearing even a little shorter than average for a Yellow Wagtail. The prominent white edges to the folded tertials reminded us of highly blancoed sergeant's chevrons and within this

pattern the pale grey of the rump, paler than the mantle, could be seen. Outstanding in a side view were the long white supercilium and the double wing-bar formed by the broad white tips to the median and greater coverts. From the front, the wholly white under-parts were perhaps the most remarkable feature. A 'necklace' of pale ash-grey spots (see detailed description below) was not discernible in the field, but the lower edge of the very white throat was clear-cut against a faint cloudiness across the upper breast. In sunshine the pure grey above and all-white below made it appear a very clean-looking bird, but in dull light the mantle sometimes seemed to be brownish-grey and the white areas looked quite dirty. No trace of yellow, green or olive could be seen in the plumage in any light, but the crown often showed a faint brownish wash.

We thought that it wagged its tail rather less frequently than a Yellow Wagtail does. Although mostly very active, running with remarkable speed and occasionally leaping into the air after flying insects, it was often extremely difficult to find against a background of lumpy earth and it was apt to 'freeze' when approached within 40 yards. When disturbed, it invariably called as it flew off, the note, uttered from one to four times, being a loud, shrill, almost bi-syllabic *tsip*, between the sharp flight-call of a Grey Wagtail *M. cinerea* and the more drawn-out call of a Yellow Wagtail, but not to be confused with either. When not occasioned by disturbance, the call was generally shorter but still loud and shrill and its distinctiveness often alone denoted the bird's presence.

Reference to papers by Kenneth Williamson on the first two British examples of the Citrine or Yellow-headed Wagtail at Fair Isle in 1954 (*Brit. Birds,* 48: 26-29) and on the plumage and structure of the species by the same author and I. J. Ferguson-Lees (*Brit. Birds,* 48: 358-362) indicated the identification of the Minsmere bird as *M. citreola*. Warnings by these authors of a similarity between some first-winter Citrine Wagtails and immature Eastern Blue-headed Wagtails (*M. f. simillima*) prompted us to catch it and this was easily done in the late afternoon on [illegible]th October when it made one of its occasional forays to a drain in a grazing field adjacent to the reserve. The following detailed description is based on the notes taken while it was in the hand:

Upper-parts: no trace of green or yellow; forehead grey, with buff at immediate base of bill; crown, nape and mantle grey, the crown being a little darker and very slightly tinged brown; lower mantle and scapulars slightly washed brownish; rump pure grey, paler than mantle; upper tail-coverts blackish on distal two-thirds. *Sides of head:* supercilium white, long, from near base of bill to near end of ear-coverts and broader behind eye; lores dark grey; ear-coverts grey (darker than crown), flecked white; thin half-circle of white below eye. *Under-parts:* chin and throat purer white than rest of under-parts; upper breast white with very pale wash of greyish-cream in which there was a string of six faint ash-grey spots; belly and under tail-coverts white; sides of breast and flanks pure

grey. *Tail and wings:* tail black, central pair of feathers with brownish tinge, outer pair mostly white and penultimate pair with less white (the black on the inner webs in the last case extending to more than the basal half); axillaries and under wing-coverts whitish-grey with faint buff tinge below bend of wing; basal half of undersides of secondaries and 5th to 10th primaries white; primaries and secondaries otherwise blackish with very thin whitish tips; broad edges to tertials white on outermost and greyish-white on other two; greater coverts paler with very broad clear-white tips; median coverts similarly broadly tipped and with darker grey centres; lesser coverts grey with slightly paler edges and inner feathers very faintly tinged olive. *Soft parts:* legs black; bill blackish with grey at base of lower mandible; gape yellow; iris black-brown. *Measurements:* wing 80.5 mm.; tail 71 mm.; bill from skull 15.5 mm.; tarsus 26 mm.; hind claw 11 mm., with toe 19.5 mm. *Wing formula:* 2nd longest, 3rd −0.5 mm., 4th −1, 5th −5, 6th −11.5, 7th −16; emarginated on 3rd, 4th and 5th, emargination on 3rd beginning 18 mm. from tip. *Weight:* 18.62 gm. at 16.30 hours on 26th October.

The bird in the hand was filmed in colour by H. Hurlock and also photographed in colour and black-and-white (see plate 49a). The flight-call was tape-recorded by John Kirby. This is the seventh British record, all the previous six having occurred at Fair Isle since 1954.

H. E. AXELL, P. J. MAKEPEACE and H. and J. FFENNELL

[We are taking this opportunity of publishing a photograph by Seppo and Timo Vuolanto of another first-winter Citrine Wagtail which was seen on Valassaaret Island, near Vaasa, Finland, from 8th to 10th September 1964 (see plate 49b). There is no previous record for Finland and this is probably the first time that the species has been satisfactorily photographed at large (as against in the hand), at least in Europe.—EDS.]

Chaffinches with papillomas.—In their paper on 'Diseases of the skin and soft parts of wild birds' (*Brit. Birds,* 57: 175-179), I. F. Keymer and D. K. Blackmore referred to several cases of unilateral papillomas on the feet of Chaffinches *Fringilla coelebs*, including three which they had examined themselves; two of the latter were described in greater detail by Derek Washington (*Brit. Birds,* 57: 184 and plate 23b). In August 1961, January 1962, January 1963 and February 1964, respectively, Chaffinches with similar tumours of the skin were received at the Veterinary Laboratory of the Ministry of Agriculture, Fisheries & Food at Lasswade, Midlothian, from G. B. G. Benson in Suffolk, F. G. Caldwell in north Germany, R. G. Newell in London, and Guy Mountfort in Surrey. They were two males and two females. Benson had also seen a male with the same condition eighteen months previously, while Newell had caught and released two similarly affected individuals (sex not stated) out of a flock of about 125.

Post-mortem examination of the four Chaffinches received at Lass-

wade showed them to vary in condition from good to poor. The tumours usually involved the metatarso-phalangeal joint and extended along the digits (plate 51a, b, c). In one case, a claw had sloughed off (plate 51a); in another, similar tumour formation involved the dorsum of the upper mandible at its junction with the feathers of the forehead (plate 51d). The tumours were firm and brownish-grey; the surface was roughened and in some cases thrown up in multiple finger-like processes resulting in gross thickening of the affected parts. Marked flattening of the tarsus from side to side and expansion in the antero-posterior plane, as described by A. D. Townsend (*Brit. Birds,* 51: 310-311), were also characteristic. The opposite limb was invariably normal (plate 51b).

The cause of many types of cancer in man, in other mammals and in birds is not well understood, but repeated injury or prolonged irritation may provoke malignant changes. Inoculation of embryonated hen eggs for pox diagnosis failed to reveal any dermotrophic virus and there was no evidence of inclusion bodies to suggest a virus as the cause of the condition.

I am grateful to Dr. J. G. Campbell, of the British Empire Cancer Campaign, for his examination of the tumours.

J. W. MACDONALD

Reviews

Studies in the Life History of the Song Sparrow. By Margaret Morse Nice. Dover Publications, New York, 1964. Two volumes: 246 and 328 pages. $1.75 each.

This latest title in the excellent Dover paperback series deserves a special welcome. A classic monograph on a single species, based on the intensive study of colour-ringed individuals, it has long been admired and quoted, but, as it appeared originally in the *Transactions of the Linnean Society of New York* and has been out of print for years, many modern ornithologists have not found it readily accessible.

The work is in two distinct parts. The first, which was published in 1937, deals with the population aspects of the Song Sparrow—its ecology, weights, migration, territorial behaviour, the relations between the sexes, breeding in all its aspects, and the survival of adults and young. The technique of colour-ringing has now become an essential part of any serious species study, but Mrs. Nice was the first to make use of it on such a scale and it is startling to remember that all this patient detailed work on a small rather drab little bird of suburban Ohio was done when she was a busy housewife.

Six years later she published the second half—a treatise on passerine behaviour, which drew both on her field experience with the Song

Sparrow and on her hand-rearing experiments with this and other species. She wrote then that she hoped it would serve as a guide to the study of bird behaviour, showing the general pattern of development and broad outlines to be expected, and, though there have been many developments in this field since, it is still, because of its clarity and exhaustive treatment, stimulating and exciting to read, while it contains, in addition, an invaluable survey of the voluminous literature on passerine behaviour up to that time. Despite the rapid growth in professional ornithology in recent years, there is still ample scope for the keen amateur to advance our knowledge of many species, and these two reasonably priced volumes offer valuable hints on practical techniques and an outline of the problems needing an answer for all species, besides, it is to be hoped, serving as a spur to those with limited time to study the common and often neglected birds close at hand.

STANLEY CRAMP

Bird Taxidermy by James M. Harrison. Percival Marshall, London, 1964. xiv+67 pages; 8 plates; 15 line-drawings. 10s. 6d. The art of preparing a good bird skin is best taught by practical demonstration, but an intelligent use of this little book should enable the complete novice to produce an acceptable result. Writing with the authority of long experience and an obvious enthusiasm for his subject, Dr. Harrison describes several ingenious instruments of his own devising and gives a wealth of practical tips for simplifying taxidermic procedures.

The author is at pains to point out that he is not advocating indiscriminate collecting. Indeed, the Protection of Birds Act 1954 strictly limits the species which are legally available to the amateur taxidermist. It is perhaps for this reason that Dr. Harrison has chosen wildfowl to illustrate many of the techniques which he describes.

A chapter is devoted to skinning and making up the cured skin; there are helpful line-drawings demonstrating several different methods. The beginner will also find instructions for the sexing of specimens anatomically and a note of the method devised by Dr. Jeffery Harrison for removing viscera for bird diet studies. For the more ambitious there is a chapter dealing with the complicated business of mounting skins and the ancillary tasks of producing cases, artificial habitats and backgrounds.

Dr. Harrison sounds a note of caution on the handling of birds which have been found dead and which may well have suffered from diseases communicable to man. At least as potentially lethal are many of the preparations—detailed in an appendix—which are essential for preserving skins from decay, deterioration and the ravages of a long list of pests. The book includes a glossary of taxidermic terms and a brief bibliography.

If the author appears to suggest, on page 47, that a hard-set egg could be found in the cloaca, this is a small lapse in a book where so much information has had to be compressed into such a sensibly priced volume.

GEORGE SHANNON

ALSO RECEIVED

Bestämningsguide för Vissa Vättingar. By Lars Svensson. Grafiska Institutets Press, Stockholm, 1964. Sw. Kr. 10.00.

Birds. By Bruce Campbell, R.S.R. Fitter, Guy Mountfort, Kenneth Williamson and others. Paul Hamlyn, London, 1965. 12s. 6d.

But Hibou Was Special. By Andrew McNeillie. Country Life, London, 1964. 18s.

Die Brutvögel in ihren Lebensgebieten. By Hans Noll. Wepf, Basel, 1965. Swiss Fr. 26.00.

Flying Free. By Reidar Brodtkorb. Methuen, London, 1964. 12s. 6d.

Life Histories of North American Thrushes, Kinglets, and Their Allies. By Arthur Cleveland Bent. Dover Publications, New York, 1964. $2.75.

Life Histories of North American Nuthatches, Wrens, Thrashers and Their Allies. By Arthur Cleveland Bent. Dover Publications, New York, 1964. $2.75.

Paysages Cynégétiques de la République Populaire Roumaine. A.G.V.P.S., Bucharest, 1964. No price.

The Birds of Natal and Zululand. By P. A. Clancey. Oliver & Boyd, Edinburgh and London. 1964. 84s.

The Way of a Countryman. By Ian Niall. Country Life, London, 1965. 25s.

Wings of Light. Compiled by Garth Christian. Newnes, London, 1965. 35s.

Letters

Variation in size, leg colour and plumage of Manx Shearwaters

Sirs,—While in no way questioning the validity of the recently published sight records of Little Shearwaters *Procellaria baroli* off Co. Donegal (*Brit. Birds,* 58: 189-190), I should like to point out that there is considerable individual variation in size among Manx Shearwaters *P. puffinus.* On scattered occasions, while handling many thousands of Manx Shearwaters on Skokholm and Skomer Island, Pembrokeshire, I have seen very small, almost runt, individuals which were only half the size of the largest. In total length these birds were slightly smaller than Puffins *Fratercula arctica*, but there is no reason to suppose that they were anything but Manx Shearwaters. Every year on Skokholm, runt nestlings are found and it is possible that some survive to become these very small individuals.

I would disagree with Oscar J. Merne and T. R. E. Devlin, the authors of the note mentioned above, over the colour of the legs of Manx Shearwaters, especially as seen at 'just under 200 yards' when the wind was NW force 9'. The legs of most Manx Shearwaters have some pink or purplish colour, but there is an equal amount of black. In some cases this black obscures the pink.

In 1964 and 1965 there has been on Skokholm a Manx Shearwater

with a partially white rump and some white feathers in the tail, wing, back and nape. D. J. Glanville has also told me of a very pale-coloured fledgling he once saw on Skokholm. Sea-bird watchers might well bear in mind the possibility of such freaks. M. P. HARRIS

A highly conditioned Grey Wagtail

Sirs,—I was very interested to read R. E. Moreau's account of a Grey Wagtail *Motacilla cinerea* which he and his wife watched at Lulworth Cove, Dorset (*Brit. Birds,* 58: 222-223). This bird flew to parked cars with wing mirrors, even though it could not possibly have seen its reflection before it got there, and attacked with such persistence that they concluded it was conditioned to regard any car with a wing mirror as embodying another wagtail.

Mr. and Mrs. Moreau made their observations on 21st, 23rd and 25th January 1965. Some ten weeks earlier, on 6th November 1964, my wife and I visited Lulworth Cove and watched what was presumably the same Grey Wagtail likewise attacking its reflection in the wing mirror of our car and then doing the same on another car next to it. Lulworth Cove is a place where many visitors park and the bird must have attacked countless vehicles over this period. It is interesting that this habit or obsession should have continued for such a long time.

ERNEST S. BOX

News and comment

Edited by Raymond Cordero

WAGBI'S conservation work.—A perusal of the 1964-65 Report and Year Book of the Wildfowlers' Association of Great Britain and Ireland (known as WAGBI) reveals a lively organisation with a growing membership. The report runs to 128 pages and much of the contents is taken up with matters that are broadly conservationist in character. It may appear something of a paradox that a wildfowlers' association should be so concerned with conservation, but the growing contemporary pressures on the countryside are continuing to bring shooters and conservationists closer together.

On this theme, the report includes a statement about WAGBI's local gravel pit reserve in west Kent which is now a joint experimental station with the Wildfowl Trust, a paper by Dr. G. V. T. Matthews on the propagation of wildfowl (originally read at the Fifth Annual Game Seminar in Ireland), and an interesting account of Grey Lag Goose conservation, notably in the Lake District.

In the last case, some 61 Grey Lag goslings were hatched out of 121 eggs from a private estate in Scotland and released in the Lakes, Northumberland and Kent. As a result, there have during the past twelve months, says the report, been numerous observations of small parties of Grey Lags all over the Lake District. It is estimated that in addition to those returning to the reserve each winter—a maximum of 62 in December 1964—there must be as many living permanently in the wild. It is hoped to make further progress with the scheme during the current year. The report

resses, incidentally, that the South Cumberland and Furness Wildfowlers' Associa-
ons have voluntarily agreed that there shall be no goose shooting on any of their
iarsh areas (where some of the Grey Lags roost in the winter) while the species is
eing established.

rojected observatory at Cap Gris Nez.—A working committee was recently set
p to establish a permanent bird observatory at Cap Gris Nez, France. The primary
ojects of the committee are to publish existing and future records, to formulate
nes of research for the future, and to co-operate with observatories and com-
arable organisations throughout Europe. The committee is anxious to obtain any
npublished records and to hear from anybody interested in visiting the area.
itially, all enquiries should be addressed to Philip S. Redman, 12 Willow Lea,
onbridge, Kent.

Recent reports

By I. J. Ferguson-Lees

(These are largely unchecked reports, not authenticated records)

his summary deals rather belatedly with the rarer species in April and May and
ould be looked at in conjunction with the general picture for this period outlined
the June number (*Brit. Birds*, 58: 231-232). The next issue will cover June, July
d August.

April and May saw the usual scattering of wanderers from southern and south-
stern Europe. Notable among these were a total of 13 to 15 **Black-winged
ilts** *Himantopus himantopus*, mostly in pairs, in Hampshire, Kent, Suffolk, Norfolk,
ncolnshire and Shropshire between 10th April and 23rd May. No less interesting,
wever, in view of current range expansion on the Continent north to the Channel
ast, were male **Serins** *Serinus canarius* in Somerset, Sussex and Cambridge in mid
ay; the Cambridge one was in song and stayed for several days, then it or another
appeared on 5th July for a further four days.

Southern herons, always a feature of this period, included **Night Herons** *Nycti-
rax nycticorax* in Scilly and Devon in April; **Little Egrets** *Egretta garzetta* in Devon
d Cornwall in April, and in Somerset and Co. Dublin in May; **Purple Herons**
rdea purpurea in Devon in April and Co. Cork in May (the latter only the second
sh record and the first for 130 years); and **Little Bitterns** *Ixobrychus minutus* in
ornwall in April (found dead) and in Ayr in May. A **Glossy Ibis** *Plegadis
'cinellus*, probably the one recorded earlier in Devon and Cornwall (58: 32, 62
d 160), was seen in Sussex in April and Hampshire in May. Among **Spoonbills**
atalea leucorodia were single ones as far west as Glamorgan in early April and
and in Northamptonshire and Leicestershire in May (also in Warwickshire in July).

Other non-passerines included an injured female **Little Crake** *Porzana parva*
cked up alive by the River Crouch (Essex) on 3rd April and later released; an
ult **Baillon's Crake** *P. pusilla* at Guisborough (Yorkshire) from 10th to 12th May;
d a scattering of **Spotted Crakes** *P. porzana* from Kent north to Lincolnshire.
e influxes of **Black Terns** *Chlidonias niger* (58: 232) also produced a **White-winged
ack Tern** *C. leucopterus* at Tring (Hertfordshire) on 2nd May and two at Hollowell
servoir (Northamptonshire) on the 14th. On 1st May there were **Gull-billed
erns** *Gelochelidon nilotica* at Dungeness (two) and Sandwich Bay (Kent) and in
ngstone Harbour (Hampshire), and on the 9th two **Caspian Terns** *Hydroprogne
pia* at Minsmere (Suffolk). A **Great Black-headed Gull** *Larus ichthyaëtus* was
ntified off Beachy Head (Sussex) on 1st May. **Ferruginous Ducks** *Aythya*

nyroca included one as far west as Glamorgan in early April. The only other non-passerine rarity was an **Alpine Swift** *Apus melba* at Spurn (Yorkshire) on 16th May, but **Hoopoes** *Upupa epops* continued to be unusually common (*cf.* 58: 221) and the May records included several right up in the north and west of Scotland

Passerine vagrants in April were rather few, but included a **Crested Lark** *Galerida cristata* on Marazion Marsh (Cornwall) on the 4th (only the second British record in the last decade), a male **White-spotted Bluethroat** *Cyanosylvia svecica cyanecula* at Hemingford Abbots (Huntingdonshire) on the 3rd, and a **Tawny Pipit** *Anthus campestris* at Sandwich Bay on the 17th. May, however, produced the usual crop of over-shooting summer visitors from the Continent. These included **Golden Orioles** *Oriolus oriolus* from the second week of May onwards in Norfolk, Suffolk, Hampshire and Devon north to Shetland and the Outer Hebrides and a scattering of **Woodchat Shrikes** *Lanius senator,* five in all, in Norfolk, Dorset and north to Fife and Shetland. A **Lesser Grey Shrike** *L. minor* was picked up dead on North Ronaldsay (Orkney) on 31st May. An **Aquatic Warbler** *Acrocephalus paludicola* on North Ronaldsay on the 3rd was followed by a **Savi's Warbler** *Lusciniola luscinioides* near Swindon (Wiltshire) on the 6th and 7th and a male **Black-headed Bunting** *Emberiza melanocephala* on Skokholm (Pembrokeshire) on the 11th. The middle of the month brought Spurn into the picture with a **Red-rumped Swallow** *Hirundo daurica* on the 13th and a **Tawny Pipit** on the 15th. A **Short-toed Lark** *Calandrella cinerea* at Hanningfield Reservoir (Essex) on the 20th was followed by another at Fair Isle from the 27th to the 29th.

May also produced a number of Scandinavian and other northern species. These included **Snowy Owls** *Nyctea scandiaca* in Orkney and Shetland (there had also been at least one in mid-April) and **Temminck's Stints** *Calidris temminckii* at Attenborough (Nottinghamshire) from the 10th to the 12th and at Pitsford Reservoir (Northamptonshire) on the 19th. But most of the real rarities were passerines. Particularly interesting were two **Thrush Nightingales** *Luscinia luscinia* on Fair Isle (both trapped) from the 24th to the 26th and from the 26th to the 29th; these were only the fourth and fifth records for Fair Isle and Britain, but even more surprising was the coincidence of two **Nightingales** *L. megarhynchos* trapped there on the 7th and 30th since they were only the second and third records for the island! Fair Isle also had an adult male **Rustic Bunting** *Emberiza rustica* on the 1st, a male **Ortolan Bunting** *E. hortulana* on the 6th, three **Bluethroats** between the 18th and the 29th, and a **Red-throated Pipit** *Anthus cervinus* on the 26th. Some of these records were matched elsewhere: a **Red-throated Pipit** on St. Agnes (Isles of Scilly) on the 6th, an immature male **Rustic Bunting** on South Uist (Outer Hebrides) on the 7th and a female **Ortolan** at Hauxley (Northumberland) on the 15th. Much earlier there had been a **Richard's Pipit** *A. novaeseelandiae* near St. Ives (Cornwall) on 10th April.

One does not expect many American birds in this period, but a **dowitcher** *Limnodromus sp.* was identified at Pagham Harbour (Sussex) on 4th April and it or another about 15 miles away at Chidham the same day; these localities are not far from where a **Short-billed Dowitcher** *L. griseus* was seen in February and March (58: 130). Another **dowitcher** appeared at Patrington Haven (Yorkshire) on 15th and 19th May, about the same time as a **Pectoral Sandpiper** *Calidris melanotos* in Co. Kerry. Single male **Green-winged Teal** *Anas crecca carolinensis* were seen in Co. Kerry, Renfrewshire and Norfolk between 21st March and 19th April and a pair of **Harlequins** *Histrionicus histrionicus* stayed near Wick (Caithness) in the latter half of April (perhaps the same pair as was seen on Fair Isle in January and February?); this species may, of course, have come from either Iceland or North America. Finally, April produced several reports of oceanic birds, including a **Sabine's Gull** *Xema sabini* at Sandwich Bay on the 19th, **Cory's Shearwaters** *Procellaria diomedea* off the coasts of Co. Donegal, Co. Cork and Hampshire between the 11th and 23rd, **Balearic Shearwaters** *P. puffinus mauretanicus* off Kent and Co. Cork, and a **Black-browed Albatross** *Diomedea melanophrys* at Morte Point (Devon) on the 25th.

Notice to Contributors

ritish Birds publishes material dealing with original observations on the birds of ritain and western Europe, or, where appropriate, on birds of this area as observed other parts of their range. Except for records of rarities, papers and notes are ormally accepted only on condition that the material is not being offered to any ther journal. Photographs (glossy prints showing good contrast) and sketches are elcomed. Proofs of all contributions are sent to authors before publication.

After publication, 25 separates of papers are sent free to authors (two or more uthors of one paper receive 15 copies each); additional copies, for which a charge made, can be provided if ordered when the proofs are returned.

Papers should be typewritten with double spacing, and on one side of the sheet nly. Shorter contributions, if not typed, must be clearly written and well spaced.

Notes should be worded as concisely as possible, and drawn up in the form in hich they will be printed, with signature in block capitals and the writer's address early written on the same sheet. If more than one note is submitted, each should on a separate sheet, with signature and address repeated.

Certain conventions of style and layout are essential to preserve the uniformity any publication. Authors of papers in particular, especially of those containing stematic lists, reference lists, tables, etc., should consult the ones in this issue as a uide to general presentation. English names of species should have capital itials for each word, except after a hyphen (e.g. Willow Warbler, Black-tailed odwit), but group terms should not (e.g. warblers, godwits). English names are ose used in *The Handbook of British Birds,* with the exception of the changes listed in *itish Birds* in January 1953 (46: 2-3). The scientific name of each species should underlined (but not put in brackets) immediately after the first mention of the nglish name. Subspecific names should not be used except where they are levant to the discussion. It is sometimes more convenient to list scientific mes in an appendix. Dates should take the form '1st January 1965' and no her, except in tables where they may be abbreviated to '1st Jan.', 'Jan. 1st', or en 'Jan. 1', whichever most suits the layout of the table concerned. It is particu- ly requested that authors should pay attention to reference lists, which otherwise use much unnecessary work. These should take the following form:

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ITHERBY, H. F. (1894): *Forest Birds: Their Haunts and Habits.* London. p. 34.

rious other conventions concerning references, including their use in the text, ould be noted by consulting examples in this issue.

Tables should be numbered with arabic numerals, and the title typed above in style used in this issue. They must either fit into the width of a page, or be igned to fit a whole page lengthways. All tables should be self-explanatory.

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British Birds

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SEPTEMBER 1965

Report on rare birds in Great Britain in 1964 (with 1963 additions)

By D. D. Harber and the Rarities Committee

THIS, THE SEVENTH annual report of the Committee, has been drawn up after the examination of about 260 records for 1964. The total was thus about the same as for each of the two previous years, if allowance is made for the removal from our list of sixteen species which were included in the 1962 report (*Brit. Birds*, 56: 394) and for the invasion of Cranes *Megalornis grus* in the autumn of 1963 (*Brit. Birds*, 57: 502-508). We note with pleasure that the proportion of rejected records was substantially lower in 1964 than in previous years. Conditions of acceptance have in no way been lowered and we can therefore attribute this change only to a general improvement in standards of observation and presentation. At the end of the report will be found five additional records for 1963. A very few 1964 records which either came in very late or which presented special problems are still outstanding. Once again our views have been requested and given on a number of Irish records and we have also been glad to help county organisations with particular records of species not on our list.

The composition of the Committee has now remained without change for two years with P. A. D. Hollom (Chairman), D. D. Harber (Hon. Secretary), D. G. Bell, A. R. M. Blake, Peter Davis, M. F. M. Meiklejohn, G. A. Pyman, F. R. Smith, R. Wagstaffe and D. I. M. Wallace. We think that we can continue to claim that all records have been considered without unnecessary delays. In fact, any delays that have occurred have mainly been the result of records reaching us late. In a few instances details of birds observed in the spring of 1964 were not sent to us until nearly a year later. In such cases it is difficult or impossible to include the record, if accepted, in our annual report for the year in question; also it is often difficult to obtain further particulars, e.g.,

from other observers, where this is necessary. We therefore hope that all records will be sent in as soon as possible after the event. In fact, particularly in cases where extreme rarities are concerned or where field identification offers difficulties, it is very helpful if we can be informed while the bird in question is still present. It is then often possible for a member or members of the Committee to see it and our task is thus facilitated.

The principles and procedure we follow in considering records were explained at length in the 1958 report (*Brit. Birds*, 53: 155-156). A revised list of the species dealt with was published last year (*Brit. Birds*, 57: 280-281) and no further changes have since been made—except that Firecrest (Scotland only) should have been omitted.

The systematic list of records is set out in the same way as its predecessors. The following points, some of which were outlined more fully in the 1958 report (*Brit. Birds*, 53: 156-158), should be borne in mind since they show the basis on which the information has been put together:

(i) The scientific nomenclature follows that given in the B.O.U. *Check-list of the Birds of Great Britain and Ireland* (1952), with the amendments subsequently proposed (*Ibis*, 98: 157-168) and those resulting from the decisions of the International Commission for Zoological Nomenclature (*Ibis*, 99: 369). Any sight records of subspecies (including those of birds trapped and released) are normally referred to as 'showing the characters' of the race concerned.

(ii) No record which would constitute the first for Great Britain and Ireland is published by us, even if we consider it acceptable, until it has been passed by the Records Committee of the British Ornithologists' Union.

(iii) In general, the report is confined to records which are regarded as specifically certain. 'Probables' are never included and square brackets are used only to denote likely escapes from captivity. In the case of the very similar Long-billed and Short-billed Dowitchers *Limnodromus scolopaceus* and *L. griseus*, however, we are continuing to publish indeterminate records and this will also apply to observations of such 'difficult' groups as frigate-birds *Fregata spp.* and albatrosses *Diomedea spp.* if and when they occur.

(iv) The basic details included for each record are (1) county; (2) locality; (3) number of birds if more than one, and age and sex if known (in the cases of spring and summer records, however, the age is given only where the bird concerned was not in adult summer plumage); (4) if trapped or found dead; (5) date or dates; and (6) observer or observers up to three in number, in alphabetical order. Other relevant information is sometimes added at the end of individual records and general comments may be given in a subsequent paragraph; although the report as a whole is confined to Great Britain, these general comments may also cover Ireland and other European countries.

A word is necessary on the problem of birds which have or may have escaped from captivity. The number, both of species and of individuals, imported into this country by dealers increases annually. Many species on our list, as well as others which could occur in Britain in a wild state, either already are or may be kept in captivity. It is usually not possible for us to establish with certainty whether any

individual bird reported to us has, in fact, come from such a source—although we make every endeavour to do this—owing to the almost endless possibilities involved (for example, birds may escape from captivity on the Continent and then visit this country). Therefore, if any of our readers has information suggesting that a record published by us relates to an 'escape', we hope that they will let us know so that we may reconsider the matter. It is our practice to omit altogether any record where there is an overwhelming probability that the bird or birds concerned had escaped from captivity. Where it seems no more than likely that the bird had such an origin, we publish it in square brackets. If a record relates to a possible 'escape', it is published with a comment to this effect. Before leaving this question, we would point out to observers that the 'tameness' or 'wildness' of an individual bird is often no indication of origin in this respect. Birds which are known to have escaped from captivity are often very 'wild' and others which can hardly have done so are sometimes very 'tame'.

It only remains to thank once again the individual observers and local organisations who have given us so much assistance in preparing this report. All records should continue to be sent direct to the Hon. Secretary at 59 Eridge Road, Eastbourne, Sussex, preferably (though not necessarily) on the 'Unusual Record' forms recently described by D. G. Bell (*Brit. Birds*, 58: 228-229) and obtainable from the Hon. Secretary.

Systematic list of 1964 records accepted

Purple Heron (*Ardea purpurea*)

Hampshire: Langstone Harbour, adult, 3rd August (P. Colston, B. Newport, R. W. Renyard *et al.*).

Kent: Sandwich Bay, 8th April (B. Hawkes); Dungeness, 20th May (L. A. Batten, P. F. Bonham, R. E. Scott).

Little Egret (*Egretta garzetta*)

Huntingdonshire: Paxton gravel-pits, 19th May (Mr. and Mrs. Packer, C. F. Tebbutt).

It must again be pointed out that most sight records of this species do not exclude the Snowy Egret *E. thula* of North America, the two being virtually indistinguishable in the field when not in breeding plumage. However, the latter has never yet been recorded in this country whereas the former now occurs annually from southern Europe.

Squacco Heron (*Ardeola ralloides*)

Devon: Slapton Ley, first-winter, 19th to 30th September (H. G. Hurrell, J. D. Pickering, F. R. Smith *et al.*).

Apart from two records in 1958, both for Devon and perhaps relating to one individual, this is the first recorded since 1954. The species' range across southern Europe is very similar to that of the Little Egret, though it is much less numerous in the western parts.

Cattle Egret (*Ardeola ibis*)

[**Dumfriesshire**: near Dumfries, 7th July (W. Austin, J. Maxwell, R. T. Smith).]

[**Lancashire**: Walney Island, 26th July (T. K. Bradshaw, E. F. Pithers, F. Quayle.)]

[**Westmorland**: Appleby, 3rd July (Miss C. W. Hull, R. W. Robson).]

[**Sussex**: Ford, 14th to 20th December, then captured by hand in poor condition and treated in captivity (B. Duffin, M. H. Terry, Major W. W. A. Phillips *et al.*).]

It seems that we were incorrect in suggesting that the Cattle Egret in Somerset in 1963 was likely to be one of those missing from Whipsnade Zoo (*Brit. Birds*, 57: 264) since we now learn that the birds kept there are pinioned in a manner which renders them permanently incapable of full flight. However, this species is kept in captivity elsewhere and we still consider it likely that the 1963 one and those listed above had come from such a source. The first three records here may well have related to the same individual. The date of the one in Sussex and the fact that it could be captured by hand make it particularly probable that it had escaped from captivity. This species is resident in Spain and Portugal, and is much less prone than other herons to wander north in Europe.

Night Heron (*Nycticorax nycticorax*)

Northamptonshire: Ditchford Lakes, two, 27th April to 3rd May (R. Felton, T. A. Hasdell, E. Taylor *et al.*).

As has been pointed out previously (e.g. *Brit. Birds*, 53: 159-160), some records of this species may relate to escapes from Edinburgh Zoo. An immature was also reported near Skibbereen, Co. Cork, from 22nd June to 5th July (*Irish Bird Report*, 1964: 10-11).

Little Bittern (*Ixobrychus minutus*)

Cornwall: Falmouth, ♂, found exhausted (died later), 3rd May (Rev. J. E. Beckerlegge, Miss F. G. Doughty, R. G. Hadden *et al.*); Sithney Common Hill, ♂, 11th May (J. S. Gilbert).

Gloucestershire: Frampton-on-Severn gravel-pits, ♂, 31st May (R. E. Saunders, C. M. Swaine *et al.*).

Glamorgan: Oxwich, ♀, 4th July (R. J. Howell, C. Stockton).

Hampshire: Winchester water meadows, ♀, 7th May (R. A. Cheke, J. R. MacKinnon, T. J. N. Sparrow *et al.*).

Kent: Dungeness, ♂, trapped, 15th May (H. A. R. Cawkell, D. Gladwin, R. E. Scott *et al.*).; Sandwich Bay, ♂, trapped, 23rd to 27th May (D. M. Batchelor, W. Harvey, E. J. Wiseman *et al.*).

Lincolnshire: Chapel Pits, near Skegness, ♂, 21st to 26th May (A. E. Smith, A. Sykes, A. D. Townsend *et al.*).

Pembrokeshire: Haverfordwest, ♂, found dead, 26th April (J. W. Donovan).

Isles of Scilly: St. Agnes, ♂, 16th April (P. Schousboe, M. J. Southam).

Sussex: Chichester gravel pits, ♂, 29th May to 2nd June (M. Shrubb, Miss J. V. Stacey *et al.*).

These eleven records suggest a remarkable spring 'invasion', particularly when one takes into account the fact that this is a shy, skulking bird, very easily missed. A female was also reported near Rosslare, Co. Wexford, on 9th and 10th May and found dead on the 11th, while another female landed exhausted at Kilmore Quay, Co. Wexford, on the 12th; the latter was captured, fed, and released on the 13th (*I.B.R.*, 1964: 11). Thus there were almost as many in Britain and Ireland in 1964 as the total of 14 during 1958-63, of which six occurred in 1958. The possibility of breeding should not be overlooked since the species nests in suitable areas of most Continental countries bordering the English Channel and southern North Sea.

White Stork (*Ciconia ciconia*)

Nairnshire/Inverness-shire: Auldearn, Dores and Fort Augustus, 17th April to 10th May (J. MacGeoch, L. MacNally, K. Tuach *et al.*).

Here again the possibility of the bird having escaped from captivity cannot be ruled out. A White Stork which was recorded in various localities along the south coast certainly had such an origin and is therefore not included.

Glossy Ibis (*Plegadis falcinellus*)

Devon: localities between the Axe Estuary and Axminster, 21st November to 19th December (G. A. Oliver, H. Palmer, W. H. Tucker *et al.*).

In the period 1958-63 about five of these birds were recorded in Britain, all between 16th September and 26th October except for one in December. This is a species which may be expected to occur here less and less frequently as the number breeding in western Europe continues to decline.

Green-winged Teal (*Anas crecca carolinensis*)

Drakes showing the characters of this American race were reported as follows:

Gloucestershire: Slimbridge, 3rd and 4th May (L. P. Alder, M. A. Ogilvie).

Norfolk: Salthouse and Cley, 7th to 11th April (N. J. Phillips, R. A. Richardson *et al.*).

Another drake was reported near Blennerville, Co. Kerry, on 19th January (*I.B.R.*, 1963: 11).

Ferruginous Duck (*Aythya nyroca*)

Derbyshire: Butterley Reservoir, 29th February to 7th March (R. A. Frost, B. C. Potter, T. G. Smith *et al.*). Ogston Reservoir, near Chesterfield, adult ♂, 8th March (R. G. Hawley).

Hampshire: Isle of Wight, Bembridge, 14th December to 17th January 1965 (Mrs. S. Newell, Mrs. M. Seabroke, Mrs. I. Warren *et al.*).

Middlesex: King George VI Reservoir, Staines, adult ♂, 19th December (J. B. Cox, S. Greenwood, D. M. Putman).

Nottinghamshire: Hoveringham gravel-pits, ♂, 3rd March (W. Priestly); [Holme Pierrepont, ♂, 29th August to 7th November (A. Aitken, P. M. Hope).]

As we have mentioned in previous years, this species is commonly kept in captivity and all the above records could therefore relate to escapes. The long stay of the one at Holme Pierrepont strongly suggests that it came from such a source. Ferruginous Ducks in captivity sometimes hybridise with Tufted Ducks *A. fuligula* and Pochards *A. ferina;* such hybrids, particularly Ferruginous × Pochard, can be very confusing in the field.

Surf Scoter (*Melanitta perspicillata*)

Kirkcudbrightshire: Southerness Point, ♂, 1st January (C. Bower).

Morayshire: Moray Firth, ♂, 14th October (C. C. I. Murdoch, R. C. Parkinson).

There are now one or two records of this North American duck in most years.

King Eider (*Somateria spectabilis*)

Shetland: Lerwick, ♂, 19th October (G. Bowers, D. Coutts, W. G. Porteous *et al.*).

This is only the third record of this arctic duck in Britain and Ireland in the seven years from 1958.

Ruddy Shelduck (*Casarca ferruginea*)

[**Lancashire:** Freckleton, two, 14th August, one remaining until 13th September (L. Eccles, Dr. N. Yates *et al.*); a female shot at Southport on 2nd October and now in the Liverpool Museum (R. Wagstaffe) was doubtless one of these.]

This species is frequently kept in captivity and the chances of genuinely wild individuals visiting this country are now much reduced with the decline in the European breeding population.

Lesser White-fronted Goose (*Anser erythropus*)

Gloucestershire: Slimbridge, adult, 2nd to 4th February (L. P. Alder).

Norfolk: Breydon Water, immature, 5th January (P. R. Allard, G. I. Morris); Halvergate Marshes, adult, 15th January (R. H. Charlwood).

Red-breasted Goose (*Branta ruficollis*)

Gloucestershire: Slimbridge, the one first recorded on 31st December 1963 (*Brit. Birds*, 57: 266) was last seen on 10th March (M. A. Ogilvie).

Gyr Falcon (*Falco rusticolus*)

Gloucestershire: Slimbridge, 26th January to 11th March (R. E. Hitchcock, M. A. Ogilvie, P. Stott *et al.*).

Lancashire: Preston, 25th August (G. Blackwekk, M. Jones, H. Shorrock).

Outer Hebrides: St. Kilda, 1st December to 24th January 1965 (P. Grubb, D. Gwynne).

Six Gyr Falcons were recorded in the period 1958-63, but this is yet another species of which any record may well relate to an escape from captivity. In Europe, this circumpolar arctic species breeds in northern Scandinavia and Iceland.

Red-footed Falcon (*Falco vespertinus*)

Hampshire: near Godshill, immature ♂, 31st May (G. H. Rees); Nursling Old Gravel Pit and its vicinity, immature ♂, 30th May to 9th June with a second bird also present on the last date (D. Glue, A. Gutteridge, N. H. Pratt *et al.*); Milford, ♂, 2nd October (Mr. and Mrs. I. R. Beames).

Kent: Sandwich Bay, 23rd to 30th May (D. M. Batchelor, R. S. Brown, A. Greensmith *et al.*); another bird, 21st to 27th June and 4th to 9th July (D. M. Batchelor, K. A. Chapman, J. Websper *et al.*).

Shetland: Unst, ♀, 19th May (E. A. Machell, M. Sinclair, R. J. Tulloch *et al.*).

Yorkshire: near Doncaster, ♀, 5th July (R. J. Rhodes).

These records conform to what has now become the normal pattern of occurrences here of this summer visitor to eastern Europe and Asia (most in May-June and occasional ones to October).

Crane (*Megalornis grus*)

Kent: Dymchurch, the juvenile first recorded on 30th October 1963 (*Brit. Birds*, 57: 506) was last seen on 4th April (*per* R. E. Scott).

This straggler from the influx of October 1963 (*Brit. Birds*, 57: 502-508) furnishes the only acceptable record of this species in 1964, in striking contrast to the situation not only in 1963 but in most other recent years.

Little Bustard (*Otis tetrax*)

Wigtownshire: Whithorn, ♂, 29th April (F. W. Champion, R. Nicholson).

Only four were recorded in the period 1958-63. The species breeds no farther away than northern France, but, when it has been possible to determine the subspecies, most of the stragglers to Britain have proved to belong to the more distant eastern race which occurs in south-east Europe and Asia.

Killdeer (*Charadrius vociferus*)

Derbyshire: Egginton sewage farm, 29th February to 22nd March (R. H. Appleby, C. N. Whipple *et al.*).

The only other British record in recent years of this common North American plover was also in an inland county (Huntingdonshire) and at about the same time of year (7th to 9th March).

Long-billed Dowitcher (*Limnodromus scolopaceus*)

Northumberland: Cresswell Ponds, 27th October to 28th December (B. Hallam, T. Hallam, P. J. Stead *et al.*).

Long-billed or Short-billed Dowitcher (*Limnodromus scolopaceus* or *griseus*)

Dunbartonshire: Ardmore Bay, 15th August (R. S. Baillie).

Lancashire: Withington sewage farm, Manchester, 29th August (J. S. Shakeshaft).

Shetland: Unst, 23rd and 24th May (E. A. Machell, M. Sinclair).

Suffolk: Havergate Island, 1st June (R. Partridge, Mr. and Mrs. E. L. Roberts).

Very few of either of these North American waders have been recorded in spring and so the Shetland and Suffolk records are noteworthy.

Great Snipe (*Gallinago media*)

Sussex: Pagham, 10th November (Major W. W. A. Phillips).

This is only the tenth record of this vagrant from north-east Europe and Asia since 1958.

Upland Sandpiper (*Bartramia longicauda*)

Suffolk: Minsmere, 24th September (H. E. Axell, P. J. Makepeace, P. Muller *et al.*).

During the period 1958-63 there were only three records of this American wader, all October-November.

Lesser Yellowlegs (*Tringa flavipes*)

Cornwall: Camel Estuary, 4th and 7th October (D. J. Britton, R. J. Salmon, Mrs. R. P. Weeks).

Leicestershire/Northamptonshire: Stanford Reservoir, 17th to 23rd October (Miss K. Kirton, F. P. Littlemore, R. Ratcliffe *et al.*).

Single ones were also reported at Tacumshin, Co. Wexford, from 11th to 13th September and on the Swords estuary, Co. Dublin, from 25th October to 10th December (*I.B.R.*, 1964: 19-20). There have now been 19 records of this North American wader since 1958.

Marsh Sandpiper (*Tringa stagnatilis*)

Norfolk: Blakeney, 20th September (T. H. Bell).

There are now about 15 records of this summer visitor from east Europe and west Asia, but this one and the two in 1963 were the first for some years.

White-rumped Sandpiper (*Calidris fuscicollis*)

Cornwall: Devoran, 19th October (Rev. J. E. Beckerlegge).

Essex: Hanningfield Reservoir, 27th August (H. J. C. Seymour, A. P. Simes).

Lancashire: Inner Ribble Marshes, two, 1st to 5th November (G. Blackwell, M. Jones, H. Shorrock *et al.*).

Lincolnshire/Norfolk: Wisbech sewage-farm, trapped, 24th October to 1st November (J. A. Hardman, Dr. C. D. T. Minton, C. W. G. Paulson-Ellis *et al.*).

Isles of Scilly: St. Agnes, 22nd to 29th September (D. L. Clugston, D. G. Healey, F. C. Reeves *et al.*).

One was also reported at Akeagh Lough, Co. Kerry, on 20th September (*I.B.R.*, 1964: 21-22). The seven years 1958-64 produced 27 records of this North American wader in Britain and Ireland.

Semi-palmated Sandpiper (*Calidris pusilla*)

Pembrokeshire: Skokholm, trapped, 21st July (A. W. Diamond, R. Harris, W. J. Plumb) (*Brit. Birds*, 58: 218-219).

This is the third British record of this North American wader and the second in July.

Buff-breasted Sandpiper (*Tryngites subruficollis*)

Leicestershire: Belvoir, two, 7th and 8th September (C. Pask).

Norfolk: Salthouse, 11th and 12th May (D. J. Britton, R. A. Richardson).

Though this species is now recorded almost annually, despite its rarity on the Atlantic coast of North America, both these records are unusual, the first because of the inland locality and the second in being during spring. There have now been 20 records, involving 25 individuals, since 1960.

Wilson's Phalarope (*Phalaropus tricolor*)

Flintshire: Bettisfield Pools, 11th October to 1st November (T. W. Pemberton, . Wood, C. Wright *et al.*).

Northumberland: Holy Island Lough, 12th to 17th September (F. G. Grey, K. Hardcastle, P. J. Stead *et al.*).

Isles of Scilly: St. Agnes, 22nd and 23rd June (P. F. Bonham, R. Overall, H. E. ott *et al.*).

There are now 17 British and Irish records of this North American wader which was not recorded over here until 1954.

Pratincole (*Glareola pratincola*)

Somerset: Chew Valley Reservoir, showing the characters of the Black-winged *nordmanni*, 6th to 9th September (H. H. Davis, M. Latham, J. E. Squire *et al.*).

Only four Pratincoles were recorded in the period 1958-63, one in spring and three in autumn. This species is a summer visitor to southern Europe and Asia.

White-winged Black Tern (*Chlidonias leucopterus*)

Cornwall: Melancoose Reservoir, Newquay, 3rd to 5th May (Rev. J. E. Beckerlegge, Dr. D. Harvey, C. D. Parkyn *et al.*).

Dorset: Lodmoor, Weymouth, 7th June (J. Bellamy, F. R. Clafton *et al.*); Brownsea Island, Poole Harbour, 15th June (A. Bromby, Miss H. A. J. Brotherton, A. St. G. Walton *et al.*).

Essex: Abberton Reservoir, adult, 20th August (L. T. Davenport, R. V. A. Marshall *et al.*); Hanningfield Reservoir, juvenile, 20th and 22nd August (S. Hudgell, A. P. Simes).

Glamorgan: Kenfig Pool and vicinity, adult, 16th to 23rd August (R. G. Knight, J. L. L. Lyons, R. G. Newell *et al.*).

Gloucestershire: Horcott gravel-pit, Fairford, adult, 23rd July (D. Veevers, Mrs. U. Wegman, G. L. Wegman).

Hampshire: Hayling Island, juvenile, 1st September (G. H. Rees).

Kent: Sandwich Bay, 29th May (J. N. Hollyer).

Lincolnshire: Huttoft Pit, adult, 2nd and 7th August (E. Mackrill, D. G. H. West); Tetney Lock, adult, 5th August (K. Robinson); it seems likely that these records refer to the same individual.

Middlesex: Staines Reservoir, juvenile, 16th to 23rd August (J. Cox, S. Greenwood, D. I. M. Wallace *et al.*); King George VI Reservoir, Staines, juvenile, 13th September (J. B. Cox, R. J. Johns, D. Putman).

Norfolk: Cley and Salthouse, juvenile, 13th and 15th August (R. J. Johns, R. A. Richardson).

Outer Hebrides: near Borue, Benbecula, 23rd May (R. Rhodes, G. Thomason, K. Williams *et al.*).

Sussex: Langney Point, adult, 12th and 13th August (R. H. Charlwood, D. D. Harber, M. Rogers); juvenile, 13th and 14th August (R. H. Charlwood, D. D. Harber, M. Rogers).

Yorkshire: Kilnsea and Spurn, adult, 24th July (G. R. Edwards, R. W. N. Knapton).

An unusually large and widespread influx, covering both spring and autumn. Not only was the number recorded probably unprecedented for a single year, but the proportion of adults in autumn was also unusually high. In addition, an adult in summer plumage was reported in Donegal Bay on 15th July (*I.B.R.*, 1964: 28). Thus there was a total of 18 or 19 records in 1964 of this species, a summer visitor to south-east Europe and Asia, compared with three to nine in each of the preceding six years 1958-63, May-June and August-September being the normal months.

Whiskered Tern (*Chlidonias hybrida*)

Cornwall: Marazion Marsh, 27th May (R. G. Hadden).

Middlesex: King George VI Reservoir, Staines, 22nd to 24th June (K. Barrett, D. Putman, D. I. M. Wallace *et al.*).

Yorkshire: Coatham Sands, adult, 30th August (W. Norman).

The last is only the second British sight-record of a Whiskered Tern in winter plumage. The other two records above were at the normal time for this south European, Asiatic and African species, but the six years 1958-63 produced only six records.

Gull-billed Tern (*Gelochelidon nilotica*)

Kent: Dungeness, two, 22nd August (J. B. Cox, R. J. Johns, D. M. Putman); Stodmarsh, 22nd August (R. G. Pitt).

Northumberland: Hauxley, 15th July (B. Galloway, E. Robson).

Sussex: Selsey Bill, 19th April (B. A. E. Marr, E. T. Welland); 21st May (L. S. Brown, I. R. Willis); 24th May (R. J. Johns, B. A. E. Marr); Pagham Harbour, 25th May (Miss J. Stacey); it seems likely that the three May records refer to the same individual.

Caspian Tern (*Hydroprogne caspia*)

Sussex: Rye Harbour, 19th July (K. Verrall); Langney Point, 13th September (D. D. Harber).

Yorkshire: Kilnsea, 26th July (G. R. Edwards).

This almost cosmopolitan but very local tern, which in Europe is largely confined to the Baltic and the Black Sea, is now being recorded almost annually in Britain though the numbers are very small, the total for 1958-64 being about 17.

Snowy Owl (*Nyctea scandiaca*)

Midlothian: Moorfoot Hills, 16th February (L. M. and J. Young) and 1st March (W. Brotherston).

Isles of Scilly: various islands from 10th October into 1965 (P. R. Colston, J. M. ocker, R. B. Tozer *et al.*).

Shetland: Fetlar, Whalsay and Yell, various dates from 10th June to 14th October, obably only one individual being involved (L. Brown, A. Gilpin, R. J. Tulloch *al.*).

The possibility of escapes cannot be overlooked. Relatively large umbers have been offered for sale in this country and the species eeds readily in captivity. It is noteworthy that there were more cords in 1963 and 1964 than for many years and this was the second ccessive year that this circumpolar arctic owl appeared in Shetland in mmer.

Alpine Swift (*Apus melba*)

Anglesey: Church Bay, 2nd August (A. J. Mercer).

Lincolnshire: Sturton Park, Bauber, 23rd April (R. Fox, P. A. Prince).

Somerset: Minehead, 22nd April (J. Martin).

Sussex: Hollingbury Camp, Brighton, 11th October (M. J. Helps).

Bee-eater (*Merops apiaster*)

Dorset: Portland Bill, 27th to 30th May (D. Carr, F. R. Clafton, C. M. Veysey *et al.*).

Suffolk: Minsmere, 8th June (H. E. Axell, F. Tate, P. J. Makepeace *et al.*).

One was also reported at Crosshaven, Co. Cork, on 26th April (*I.B.R.*, 1964: 30).

Short-toed Lark (*Calandrella cinerea*)

Pembrokeshire: Skokholm, 27th and 28th June (Dr. M. P. Harris, Dr. C. M. Perrins, W. J. Plumb *et al.*).

Isles of Scilly: St. Agnes, 25th September (D. L. Clugston, D. J. Montier, J. R. Mullins *et al.*).

Shetland: Fair Isle, adult, 15th May (G. Barnes, R. H. Dennis, C. S. Waller); adult, 18th to 20th May (R. H. Dennis, C. S. Waller); immature, trapped, 9th to 11th July (G. Barnes, R. H. Dennis, C. S. Waller).

There have now been about 20 records of this south European, Asiatic and African species in Britain and Ireland since 1958.

Red-rumped Swallow (*Hirundo daurica*)

Kent: Ruxley gravel-pit, 25th April (E. T. W. Kemp, F. F. B. Martin, P. Rayfield *et al.*).

Isles of Scilly: St. Agnes, trapped, 10th and 11th November (F. H. D. Hicks, Miss H. M. Quick).

Yorkshire: Spurn, 3rd May (J. Cudworth, B. R. Spence, G. R. Wilkinson).

There are only nine previous British and Irish records of this species (which, however, seems to be spreading in Iberia and the Balkans). All have been in spring (March-June) except for one in autumn (Kent, 28th August 1959). The November date of the St. Agnes record is therefore quite without precedent.

Eye-browed Thrush (*Turdus obscurus*)

Northamptonshire: Oundle, 5th October (M. J. Smith, Mrs. W. Smith).

Isles of Scilly: St. Agnes, 5th December (J. A. Burton, F. H. D. Hicks, S. D. G. Stephens).

Inner Hebrides: North Rona, 16th October (N. Picozzi).

These are the first British records of this Siberian thrush and full details will be published later. However, the species has long been known as a vagrant to central and western Europe and, for example, there are about 20 records for Germany (though only two in the present century).

White's Thrush (*Turdus dauma*)

Cheshire: Weaverham, 7th May (C. Allen, F. Allen, M. Winnington).

Nearly all the previous 28 or so British and Irish records of this Asiatic species have been in winter and the above date is therefore remarkable. However, it must be pointed out that a few of these birds are imported and kept in captivity in this country.

Black-eared Wheatear (*Oenanthe hispanica*)

Shetland: Fair Isle, ♀, trapped, 19th May (R. H. Dennis, C. S. Waller); first-winter ♀, trapped, 27th September (R. H. Dennis, E. J. Wiseman).

Though there are 15 previous records of this summer visitor to southern Europe and Asia, in both spring and autumn, the species has not been recorded in Britain and Ireland since 1956.

Savi's Warbler (*Locustella luscinioides*)

Suffolk: Minsmere, 20th April to 30th May (H. E. Axell, A. J. J. Cranmer, P. J. Makepeace *et al.*).

Great Reed Warbler (*Acrocephalus arundinaceus*)

Inverness-shire: a locality in the east of the county, 8th to 20th June (Miss H. L. Glenn, C. C. I. Murdoch, D. N. Weir *et al.*).

Shetland: Fair Isle, trapped, 8th to 11th June (G. Barnes, R. H. Dennis, C. S. Waller *et al.*).

Suffolk: Minsmere, 26th May (H. E. Axell, P. J. Makepeace, A. E. Smith *et al.*).

Sussex: Sidlesham, trapped, 25th June (J. Weller).

One was also reported on Cape Clear Island, Co. Cork, from 10th to 26th June (*I.B.R.*, 1964: 33-34), bringing to 26 the total of records since 1958 of what is a common summer visitor to many adjacent parts of the Continent. Field observations do not normally exclude the Clamorous Reed Warbler *A. stentoreus* of southern Asia and Egypt, but this species is practically unknown in Europe.

Aquatic Warbler (*Acrocephalus paludicola*)

Cornwall: Marazion Marsh, 3rd October (B. Pattenden, N. R. Phillips).

Devon: Slapton Ley, trapped, 12th August (F. R. Smith); trapped, 19th August (H. P. Sitter, F. R. Smith); trapped, 20th August (H. P. Sitter); trapped, 3rd September (S. G. Madge, H. P. Sitter); Dawlish Warren, 11th September (R. Angles).

Kent: Dungeness, 27th September (R. E. Emmett, D. I. M. Wallace).

Sussex: Pagham, trapped, 23rd August (S. Beddy, C. J. Mead, P. J. Straw *et al.*).

These eight records of this summer visitor to eastern Europe and western Asia bring the total since 1958 to about 70.

Subalpine Warbler (*Sylvia cantillans*)

Dorset: Portland Bill, ♂, trapped, 19th to 21st April (Dr. J. S. Ash, F. R. Clafton, R. J. Jackson *et al.*).

Shetland: Fair Isle, ♂, trapped, 23rd and 24th April (G. Barnes, R. H. Dennis, T. Henderson *et al.*).

These are the first April records for the British Isles. This summer visitor to southern Europe has now been recorded here 22 times (16 since 1951).

Greenish Warbler (*Phylloscopus trochiloides*)

Dorset: Verne Common, Portland, 21st November (D. C. Mole).

London: Dollis Hill, 1st October (E. Simms).

Isles of Scilly: St. Agnes, 20th December and staying on into 1965 (F. H. D. Hicks, J. L. F. Parslow, Mrs. R. E. Parslow).

The last of these is the first December record for Britain, though there is one for January-February. Three were also reported on Cape Clear Island, Co. Cork, between 25th September and 4th November (*I.B.R.*, 1964: 35-36). This summer visitor to north-east Europe and Asia, which normally winters in India, has now mustered about 40 records here, all but one in the last 20 years.

Arctic Warbler (*Phylloscopus borealis*)

Shetland: Fair Isle, adult, trapped, 14th to 19th August (R. H. Dennis, P. Hepple-ston, E. J. Wiseman *et al.*); first winter, trapped, 9th September (R. H. Dennis, D. Rowlands, E. J. Wiseman *et al.*); two, first-winter, trapped, 12th September (R. H. Dennis, E. J. Wiseman *et al.*).

Yorkshire: Spurn, trapped, 5th September (J. Cudworth, J. R. Mullins, B. R. Spence *et al.*).

The total recorded during 1958-63 was only eleven, so that these five records in four weeks were unusual. This north European and Siberian species, which winters in south-east Asia, nests as near to Britain as Lapland.

Pallas's Warbler (*Phylloscopus proregulus*)

Isles of Scilly: St. Agnes, 1st November (B. P. Austin, F. H. D. Hicks, B. S. Milne).

This is the fourteenth record of this summer visitor to southern Siberia. All but one of these have been since 1951 and there were no less than six in 1963 (*Brit. Birds*, 57: 508-513). Continental countries have also had several records in recent years.

Dusky Warbler (*Phylloscopus fuscatus*)

Isles of Scilly: St. Agnes, trapped, 19th October (B. P. Austin, P. C. Chance, B. S. Milne, *et al.*).

This is only the third British record of this summer visitor to the eastern half of Asia.

Radde's Bush Warbler (*Phylloscopus schwarzi*)

Suffolk: Walberswick, trapped, 4th October (H. E. Axell, G. L. Clarke, D. J. Pearson *et al.*).

This is the fifth British record of this summer visitor to southern and eastern Siberia, and the fourth since 1961.

Collared Flycatcher (*Muscicapa albicollis*)

Cumberland: Eskmeals, near Ravenglass, adult ♂, found dead, 2nd June (J. Cairns, J. Jackson, A. B. Warburton).

This is the fifth British record. It must be noted, however, that even this species is sometimes kept in captivity and that at least one is known to have escaped in 1964, though that was a first-summer male.

Richard's Pipit (*Anthus novaeseelandiae*)

Norfolk: Blakeney Point, 5th September (P. Colston, R. J. Johns, J. Whitelegg *et al.*).

Isles of Scilly: St. Agnes, 18th October (J. M. Crocker, B. S. Milne, R. B. Tozer *et al.*); up to three (one trapped), 24th to 29th October (B. P. Austin, F. H. D. Hicks, B. S. Milne); St. Mary's Airport, 27th October (B. S. Milne).

Shetland: Fair Isle, 21st May; single birds on many dates between 12th September and 3rd October and up to two on dates between 17th and 30th October (R. H. Dennis, C. S. Waller, E. J. Wiseman *et al.*).

Sussex: Falmer, 8th to 11th October (M. J. Helps, A. R. Kitson).

Yorkshire: Spurn, two, 24th September (R. C. Parkinson, D. A. Scott, B. R. Spence *et al.*).

Thus the record numbers of 1963 were about equalled in 1964. The one in May is very unusual.

Tawny Pipit (*Anthus campestris*)

Fife: Isle of May, 26th to 29th May (Prof. M. F. M. Meiklejohn).

Norfolk: Blakeney Point, 9th June (A. K. Searle).

Isles of Scilly: St. Agnes, trapped, 18th to 20th October (B. P. Austin, P. C. Bance, B. S. Milne *et al.*).

Sussex: Sidlesham, 2nd and 3rd September (M. Shrubb, Miss J. V. Stacey); Selsey Bill, 6th September (M. J. Helps, B. A. E. Marr, R. F. Porter *et al.*); Langney Point, adult, 3rd September (R. H. Charlwood), juvenile, 7th to 11th September (R. H. Charlwood, D. D. Harber, M. Rogers *et al.*).

Red-throated Pipit (*Anthus cervinus*)

Middlesex: Staines Reservoir, 17th and 18th April (J. B. Cox).

Northumberland: Hauxley, two, 9th May (E. Robson, B. Little); two, 9th to 11th September (B. Little, B. Marshall, E. Robson).

Thus there were again two spring records of what used to be regarded almost exclusively as an autumn visitor; this applies now to seven of the total of 14 records since 1958. However, the April date is particularly early for this summer visitor to north-east Europe and Siberia.

Citrine Wagtail (*Motacilla citreola*)

Shetland: Fair Isle, first-winter, trapped, 19th September (R. H. Dennis, D. A. Rowlands, E. J. Wiseman).

Suffolk: Minsmere, first-winter, trapped, 17th October to 14th November (H. E. Axell ,J. ffennell, P. J. Makepeace *et al.*) (*British Birds*, 58: 344-346).

There are now seven British records of this Russian and Siberian species, all from Fair Isle except for this one in Suffolk, which is therefore the first for mainland Britain and which is made more unusual still by the long off-passage period.

Black-headed Wagtail (*Motacilla flava feldegg*)

Cornwall: Marazion Marsh, ♂ showing the characters of this subspecies, 29th June (Rev. J. E. Beckerlegge).

This race of the Yellow Wagtail breeds in the Balkans and Asia Minor.

Steppe Grey Shrike (*Lanius excubitor pallidirostris*)

Shetland: Fair Isle, first-winter showing the characters of this subspecies, trapped, 18th October (G. L. Barnes, R. H. Dennis, E. J. Wiseman *et al.*).

This race of the Great Grey Shrike breeds in desert scrub from the lower Volga and the Caspian eastwards. The above is the second British record. The previous one, similarly involving a first-winter bird trapped at Fair Isle, occurred on 21st September 1956 (*Brit. Birds*, 50: 246-249).

Lesser Grey Shrike (*Lanius minor*)

Outer Hebrides: near Loch Druidibeg, South Unst, 29th May (R. P. Cockbain, G. Follows, G. Thomason *et al.*).

This summer visitor to southern and eastern Europe and south-west Asia was formerly regarded as a very rare vagrant here, but it is now proving of almost annual occurrence, with 14 records in Britain and Ireland since 1958, this number being almost equally divided between spring and autumn.

Woodchat Shrike (*Lanius senator*)

Caernarvonshire: Bardsey, 26th May (G. H. Evans, P. Davis).

Dorset: Portland Bill, juvenile, trapped, 5th and 6th September (F. R. Clafton, J. Lovatt, R. Wilby *et al.*).

Norfolk: Holme, 24th to 26th April; 24th to 26th May (P. R. Clarke, H. P. Crawley, C. N. Arnold); Salthouse Heath, 23rd May (D. Christie).

Pembrokeshire: St. Davids, two, 20th April (E. H. Taylor).

Isles of Scilly: St. Agnes, immature, 25th to 29th August (D. G. Healey, F. H. D. Hicks, P. R. Holness *et al.*).

Yorkshire: Kilnsea, 7th to 14th June (J. Cudworth, B. R. Spence, C. Winn *et al.*).

An immature was also reported on Cape Clear Island, Co. Cork, on 4th August. This flush of records reverses the decreasing trend of the previous three years when this summer visitor to western and southern Europe was recorded only five, three and two times respectively.

Yellow Warbler (*Dendroica petechia*)

Caernarvonshire: Bardsey, trapped, died later, 29th August (R. F. Durman, G. H. Evans, H. Miles *et al.*).

This is the first British and Irish record of this American warbler. Full details will be published in due course.

Rose-coloured Starling (*Sturnus roseus*)

Dorset: Lodmoor, Weymouth, adult, 21st August (D. R. Rowston).

As has been stated previously, this fluctuating summer visitor to south-east Europe and south-west Asia is regularly kept in captivity and individuals doubtless escape at times.

Serin (*Serinus canarius*)

Devon: Budleigh Salterton, ♂, 22nd to 25th May (R. Khan).

Dorset: Portland Bill, 1st November (Dr. J. S. Ash, F. R. Clafton, K. D. Smith *et al.*).

Kent: Dungeness, ♂, trapped, 4th to 7th April (D. Gladwin, T. P. Inskipp, R. E. Scott *et al.*).

Shetland: Fair Isle, ♂, 29th May (R. H. Dennis, C. S. Waller).

Yorkshire: Spurn, 8th May (P. J. Carlton, B. R. Spence, G. R. Wilkinson).

It is considered that the one in Devon may have escaped from captivity. As a breeding species the Serin is still spreading slowly along the Channel coast of France. The above five records (all but one in spring) compare with none in 1963 and 12 in the five years 1958-62.

Scarlet Grosbeak (*Carpodacus erythrinus*)

Orkney: Auskerry, three, 19th September (E. Balfour, E. J. Williams).

Shetland: Fair Isle, trapped, 1st September; trapped, 18th September; up to three, ...th to 24th September; single birds, 26th September and 4th October (R. H. Dennis, J. Wiseman *et al.*).

Yorkshire: Spurn, 26th and 27th May (G. R. Edwards, B. R. Spence, G. Tuffnell).

All the above records relate to females or immatures. Adult males of this summer visitor to eastern Europe and Asia are very seldom recorded here. The May occurrence was unusual as most appear in autumn.

Song Sparrow (*Melospiza melodia*)

Yorkshire: Spurn, trapped, 18th May (J. Cudworth, G. R. Edwards, B. R. Spence *et al.*).

This is the second record of this American species, the first having been on Fair Isle from 27th April to 10th May 1959 (*Brit. Birds.* 52:419-421).

Black-headed Bunting (*Emberiza melanocephala*)

Caernarvonshire: Bardsey, ♂, 16th May (G. H. Evans).

Though this species is kept in captivity, the date seems to suggest a genuine migrant, like the one which was recorded at the same place on 27th May 1963. Spring records are perhaps more likely to be genuine, as a result of overshooting, since this summer visitor to south-east Europe and Asia Minor migrates south-east in winter.

Yellow-breasted Bunting (*Emberiza aureola*)

Orkney: Auskerry, 22nd September (E. Balfour, E. J. Williams).

This summer visitor to north-east Europe and northern Asia, whose range is expanding in Finland, has now been recorded here 19 times (nine times since 1958), all but twice in September.

Rustic Bunting (*Emberiza rustica*)

Shetland: Fair Isle, ♀, trapped, 26th to 28th September (G. Barnes, R. H. Dennis, E. J. Wiseman *et al.*), ♂, 4th October (R. H. Dennis, C. K. Williams, E. J. Wiseman *et al.*).

There have now been 22 records of this north-east European and Siberian bunting since 1958, mostly September-October but five April-June.

Little Bunting (*Emberiza pusilla*)

Northumberland: Holy Island, at least two, 4th and 5th October (J. M. Butterworth, W. Mulligan, A. R. Sumerfield); Ross links, 9th October (P. J. Brewster).

Shetland: Fair Isle, first-winter ♂, trapped, 7th October (R. H. Dennis, E. J. Wiseman *et al.*).

Sussex: Langney Point, 15th October (D. D. Harber).

Another north-east European and Siberian bunting which has produced nearly 40 records since 1958, about 23 of them on Fair Isle and mostly September-November but about nine March-May.

Supplementary systematic list of 1963 records accepted

Albatross (*Diomedea sp.*)

Yorkshire: Spurn, 10th November (J. Cudworth).

Pied-billed Grebe (*Podilymbus podiceps*)

Somerset: Blagdon Lake, 22nd December (R. J. Prytherch, H. A. Thornhill).

This is the first British and European record of this North American species and full details appeared in *Brit. Birds,* 58: 305-309.

Marsh Sandpiper (*Tringa stagnatilis*)

Essex: Rainham and Aveley Marshes, 26th to 28th August (B. Kemp, K. Noble *et al*).

This was almost certainly the same individual as the one recorded across the Thames at Swanscombe, Kent, from 18th August to 2nd September (*Brit. Birds,* 57: 268).

Baird's Sandpiper (*Calidris bairdii*)

Lincolnshire/Norfolk: Wisbech sewage-farm, 22nd July to 6th August (J. S. Clark, G. M. S. Easy, C. A. E. Kirtland *et al.*)

Nine records of this American wader are now accepted. All the others have been in September-October except for one in May-June.

American Robin (*Turdus migratorius*)

Isles of Scilly: Gugh and St. Agnes, two, a day or two prior to 20th December; one trapped, 20th December, and found dead, 28th December (F. H. D. Hicks, L. Hicks, Miss H. M. Quick *et al.*).

This is the sixth record for Britain and Ireland.

Appendix. Observations in 'Recent reports' not now accepted. The following records were mentioned in 'Recent reports', but were found to be unacceptable upon examination by the Rarities Committee. This list includes all the records of this kind (apart from Irish ones) unless they were qualified by such terms as 'apparent' or 'probable', or unless they appeared in brief summaries without precise date or location. A few other observations remain outstanding, no decision having yet been reached on them. It should be noted that in a number of cases records mentioned in 'Recent reports' have not been submitted for our consideration, because they have either been withdrawn by the observers or been rejected by county recorders. It should once

again be stressed that rejection of records does not imply a slur on the observers concerned. Often it merely means that we considered the evidence insufficient for complete acceptance.

	1964
Black Duck	King George VI Reservoir, Staines, Middlesex to 8th, 15th November (*Brit. Birds,* 58: 31).
Crane	Cley, Norfolk, 8th April (57: 260)
Gull-billed Tern	Selsey Bill, Sussex, accepted only for three dates between 19th April and 24th May (57: 339)
Red-rumped Swallow	Littlebrook, Kent, 23rd April (57: 338)
Aquatic Warbler	One of two, Sandwich Bay, Kent (57: 444)
Greenish Warbler	The Naze, Essex, 9th-10th September (57: 444)
Dusky Warbler	Huttoft, Lincolnshire, 1st November (57: 524)
Richard's Pipit	Holme, Norfolk (57: 524)
Woodchat Shrike	Salthouse Heath, Norfolk, 23rd April (error for May) (57: 338)
Two-barred Crossbill	Two, Bawtry Forest, Nottinghamshire (57: 524)

British bird-photographers

5. G. K. Yeates

(Plates 52-59)

ALTHOUGH GEORGE YEATES has not photographed a bird for nearly a decade, he has such an established reputation that his name would still be on most people's lists of the top ten British bird-photographers. What is it about him that makes him such a permanency? He is, of course, an outstanding personality with, as the late A. W. P. Robertson once wrote, 'an active brain, an orderly mind and a fierce, restless energy', but these qualities are not enough to keep his name to the fore in an ever-developing field which produces new masters every year. Nor is it because his work lives on in several fluently written and highly readable books which give vivid impressions of birds, places and people—*Bird Life in Two Deltas* (1946), *Flamingo City* (1950) and *The Land of the Loon* (1951), describing the series of visits he made to Spain, France and Iceland, and *Bird Haunts in Southern England* (1947) and *Bird Haunts in Northern Britain* (1948), telling of his experiences nearer home.

No, the simple fact is that his photography was so ambitious in its conception and so outstanding in its execution that few others, amateurs or professionals, have attempted the like. This is all the more

PLATE 52. Male Pink-footed Goose *Anser fa[illegible]*, Iceland, 195[illegible] (G. K. Y[illegible])
(pages 372-374)

PLATES 53 and 54. Above, Great Northern Diver *Gavia immer* on nest, Iceland, 1949. Opposite and below, Flamingoes *Phoenicopterus ruber* with young chicks, Camargue, 1948 and 1956; note how the adults below vary in size (*G. K. Yeates*)

PLATES 55 and 56. Three nests in Britain. Upper left, Corncrake *Crex crex*, Outer Hebrides, 1951. Lower left, Grasshopper Warbler *Locustella naevia*, Dorset, 1936. Below, Greenshank *Tringa nebularia*, Sutherland, 1946. *G. K. Yeates*

PLATE 57. Cattle Egrets *Ardeola ibis* at reed nest, Spain, 1935 (*G. K. Yeates*)

PLATE 58. Purple Heron *Ardea purpurea* with young, France, 1947 (G. K. Yeates)

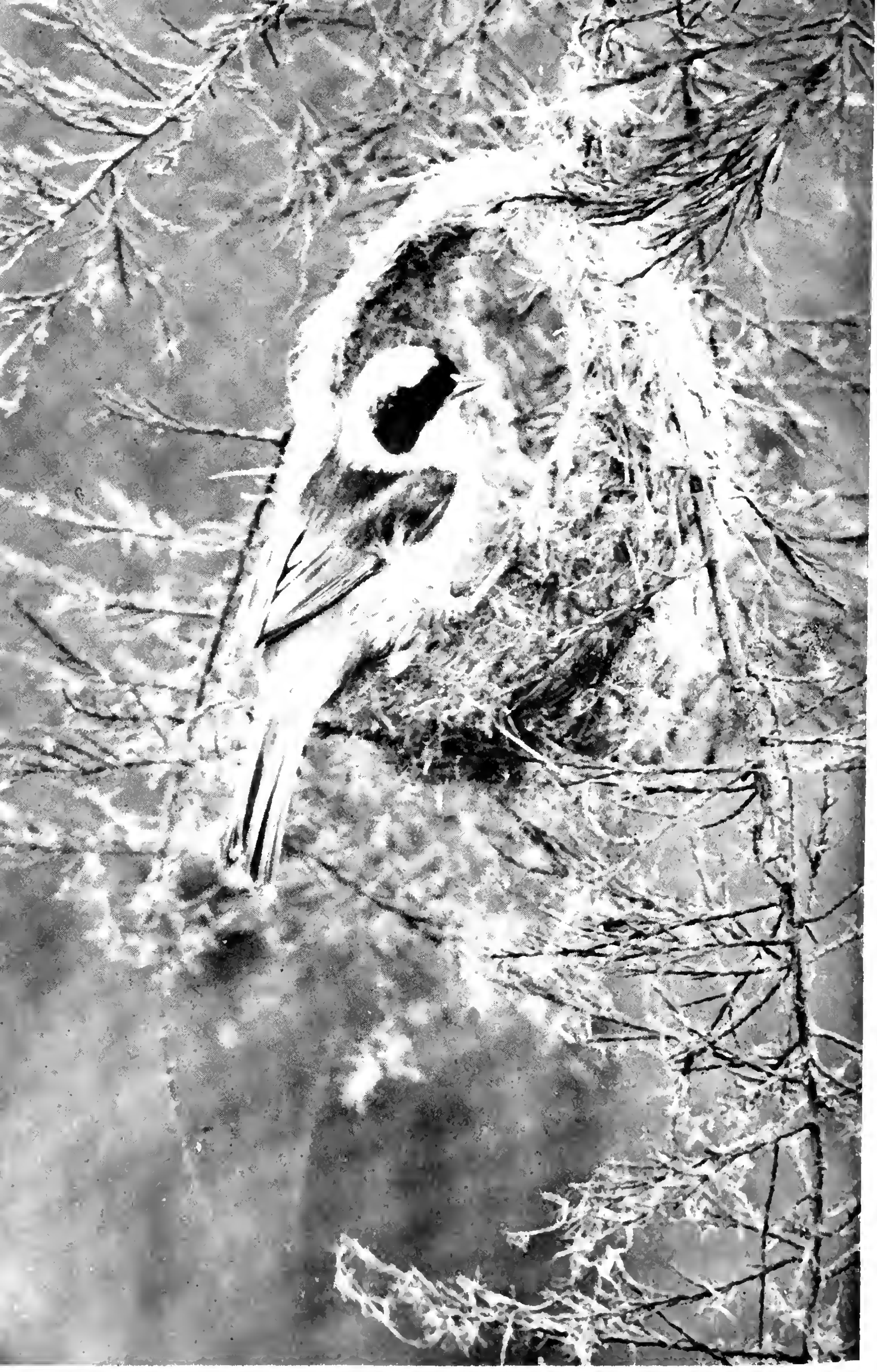

PLATE 59. Penduline Tit *Remiz pendulinus* building, France, 1937 (G. K. Yeates)

remarkable when one knows him well enough to realise that he was never really interested in photography for its own sake, though he had to acquire a sound fundamental knowledge in order to satisfy the high standards which he sets himself in anything he does. That he did acquire such a knowledge was amply demonstrated by the Royal Photographic Society's electing him a Fellow in 1937 and awarding him its Exhibition Medal in 1947, while at the big *Country Life* International Exhibition of Wild Life Photography in 1950 he was one of the very few recipients of a Silver Medal.

Yeates was born in Leeds on 7th July 1910, and was educated at Lancing and Balliol College, Oxford. From 1933 to 1939 he taught History and English at Sherborne. The war years were spent as a Captain in the Dorset Regiment, though he did not serve abroad, and then in 1945 he went north to Otley in his native Yorkshire to found Dales Leather Company, of which he is still a director. He and his wife Sybil, whom he married in 1934, live not far away near Harrogate.

Bird-photographers may broadly be divided into photographers who specialise in birds and ornithologists who make photography their medium, and it will already be obvious that Yeates belonged in the latter category. He cannot remember a time when he was not interested in birds and all his leisure hours at school were spent in watching them or finding their nests. A desire to photograph as a means of keeping a permanent record of what he saw and found was probably always latent, but what really set him going, in his first summer at Oxford, was meeting H. N. Southern, later to become the first editor of *Bird Study*, who was doing a lot of photography at that time. It would be fair to sum up Yeates's interests by saying that he used to regard birds as something to be observed intelligently but not studied particularly scientifically. The discovery of a rare species and particularly the finding of its nest were as much a field sport to him as wildfowling or fishing; and a bird photograph was as much a trophy as a stag's horns are to a stalker.

Yeates's five books about his experiences and travels have already been mentioned—though he also wrote another, on *Bird Photography* (1946), a surprising achievement for one whose interest in photography was, at heart, secondary. His main haunts in Britain were Dorset, Exmoor, the Norfolk Broads, the Scottish borders, the Grampians, Rothiemurchus, Sutherland, Shetland and South Uist. The three photographs on plates 55 and 56 are typical of the many which resulted from this side of his activities. But it is Iceland and the Camargue, where he was one of the pioneer ornithologists, that will always be associated with his name. In this selection of his photographs, many of which will be familiar because it would be wrong to show anything but his best and because there is this sad absence of

new work, the lure of the north is typified by his wonderfully stereoscopic Pink-footed Goose *Anser brachyrhynchus* (plate 52) and his beautiful close-up of a Great Northern Diver *Gavia immer* (plate 53a), while the Flamingos *Phoenicopterus ruber* of the Camargue (plates 53b and 54) and two of his many studies of southern herons (plates 57 and 58) symbolise the hot sun of the south. His series of a Penduline Tit *Remiz pendulinus* building its nest (one of which is reproduced on plate 59) and also the Grasshopper Warbler *Locustella naevia* in Dorset (plate 55b) emphasise that he was not only interested, as some photographers are, in the large, spectacular species. He went to the Camargue in 1936, 1937, 1947, 1948, 1950 and 1956, and to Iceland in 1948, 1949 and 1954 (the last time with the late Niall Rankin whom he regards as one of the greatest of all bird-photographers). However, his first foreign trip of all, in 1935, was to neither of these areas, but to Andalucia in southern Spain (including the marismas and the Coto Doñana) with the late B. W. Tucker who was later to succeed H. F. Witherby as editor of *British Birds*.

His association with Bernard Tucker led to his becoming a kind of 'unofficial' photographic advisor to *British Birds* when this journal began making a regular feature of photographic plates in 1946. In 1952 this advisory position was put on a more formal basis and his name appeared on the title page as the first photographic editor, a position which he held until December 1959. He was also secretary of the Zoological Photographic Club, that select organisation which is limited to 40 members, from 1948 to 1953 and afterwards its president in 1954-55. Then came his decision to give up photography and to retire from the active ornithological scene. For 25 years he had turned all his spare-time energies in these directions and, as a result, had been able to devote little time to such other interests as salmon fishing, wildfowling and alpine gardening. In addition, his business commitments had become so heavy that he could no longer afford the three or four consecutive weeks which he regards as the minimum period for photographic trips abroad, while at home in Britain he felt that nearly every species had been so well portrayed by one bird-photographer or another that further work would be largely repetitious. His books and his outstanding skill as a lecturer who is more able than most to transport his audiences to the places he has visited, as well as his official capacities in the world of bird photography, were also resulting in far more correspondence than he felt he could cope with on his tired return from the office.

George Yeates is a sad loss to bird photography and there are many who look forward to the day when he returns to the fold. He himself does not see how this could happen before he retires, by which time 'advancing age will have made the heavy work involved impossible'. However, we can but hope. I. J. Ferguson-Lees

Feeding habits of the Great Grey Shrike in winter

By Horst Mester

STOKOE (1961) and Harrison (1961) described Great Grey Shrikes *Lanius excubitor* persistently chasing small birds and the latter suggested that hunting flight might be more usual than the surprise swoop from a perch which *The Handbook of British Birds* infers is the regular method of capture. In fact, such chases are not uncommon, but Steinfatt (1941) was more correct when he stated that the Great Grey Shrike hardly ever actually catches small birds except by surprising them. The same comment was made by Fellenberg (1958) who watched unsuccessful pursuits of a Meadow Pipit *Anthus pratensis* and a tit *Parus sp.* The following experiences of my own near Fröndenberg, Germany, also illustrate this.

On 22nd March 1955, for example, I saw a Great Grey Shrike pursue a House Sparrow *Passer domesticus* a long way over grassland until the latter escaped around the corner of a building. Again, on the afternoon of 19th December 1959, I watched a Great Grey Shrike following a Bullfinch *Pyrrhula pyrrhula* for more than a quarter of an hour. The Bullfinch, calling anxiously all the time, was circling round a small shrubbery of willows and a row of poplars on the banks of the frozen Ruhr. It soon seemed exhausted and repeatedly tried to reach the bare branches of the trees, but the shrike succeeded in preventing this. Nevertheless, the Bullfinch was always able to avoid the swoops of the shrike and in the end the latter gave up the chase, and returned to the top of a high tree. Then a little later I saw the shrike not far away trying unsuccessfully to catch a Wren *Troglodytes troglodytes* which was flying along a narrow strip of broken-down sedge on the opposite bank of the river. Soon afterwards, however, it flew past with a House Sparrow in its bill and some time later I observed it carrying a vole or mouse in its claws. There was a thick cover of snow on the ground at that time and more was falling, while the temperature had been well below freezing for several days; I shall show later that food shortage in hard weather may cause this persistent chasing of small birds.

On the other hand, even fast-flying birds are sometimes caught by Great Grey Shrikes, though not necessarily in flight. In May 1956 I found the remains of a male Swallow *Hirundo rustica* beneath a shrike's nest in the Fröndenberg area, and both Buxton (1945) and Ryser (1948) recorded the taking of this species. Bäsecke (1941, 1956) also listed the Swallow among passerines brought to the nest for the young shrikes, as well as Skylark *Alauda arvensis*, Woodlark *Lullula arborea*,

Meadow Pipit and Yellowhammer *Emberiza citrinella*, and a treecreeper *Certhia sp.* which had been carried to the breeding place from a distance of at least one kilometre. A list of prey published by Chessex (1962) included not only Swallow but also House Martin *Delichon urbica* and Sand Martin *Riparia riparia*, as well as Skylark, Water Pipit *Anthus spinoletta*, Wren, Robin *Erithacus rubecula*, Whitethroat *Sylvia communis*, Firecrest or Goldcrest *Regulus ignicapillus* or *regulus* and a variety of tits, buntings and finches. Meadow and Water Pipits are both common victims in winter in my part of Westphalia owing to their terrestrial habits, particularly in boggy areas where the shrikes catch them by hovering or by a surprise swoop from a perch; Long-tailed Tits *Aegithalos caudatus* have also been taken by these shrikes in this area on a number of occasions. I have not attempted a comprehensive list of the birds recorded as prey because that would be almost endless, but the above and other records mentioned later will give an indication of the normal range of bird victims; in effect, almost any small passerine is likely to be taken and Chessex even recorded fruitless attacks on a Hoopoe *Upupa epops* and a Little Egret *Egretta garzetta*!

Bannerman (1953) wrote that he had never seen 'a shrike attack and kill a bird' nor had he 'read any account of *how* this feat is managed. It seems incredible that it can kill birds as large as a blackbird or fieldfare, unless sickly individuals fall prey to its cruel beak.' The 1905 edition of Naumann's classic work on the birds of Germany commented that the Great Grey Shrike mostly surprises small birds when they are settled, but that it also catches them in flight when it can drive them away from shrubs. This account went on to say that it usually takes them in its bill and feet together; that when swooping on another bird it always grips it from one side just like a hawk; and that it does not lack the courage to attack birds as big as Fieldfares *Turdus pilaris*, or even Partridges *Perdix perdix* which have got caught in deep snow. Carl Hennicke, the editor of the 1905 edition of Naumann's work, added records of one catching and killing a flying Song Thrush *Turdus philomelos* and a Blackbird *T. merula*.

Perhaps the fullest study of the Great Grey Shrike's hunting behaviour is that of Cade (1962) who, incidentally, concluded that 'aerial capture is exceptional and that birds are usually taken by surprise while perched on the ground or in bushes and trees'. He noted that special movements of the wings and tail—drooping the primaries, then momentarily sweeping forward the whole wing to flash the white patches and at the same time spreading the tail to display the white edges—are used as part of the hunting tactics. For example, 'when the prey has taken a stand in dense cover . . . the wing and tail movements produce a startling effect that sometimes flushes the prey into flight or into moving sufficiently to make itself more vulnerable to capture'. He also observed that the shrike catches birds with its feet

in the same way as an *Accipiter* does and that it kills them by biting into the neck like a falcon. On the other hand, it does not usually grab rodents in its feet because it is likely to be bitten if it does so; instead it dances about on the ground, reaching in to deliver quick bites at the neck. He found that small rodents of up to 25 grams are killed in a few seconds, but that larger ones weighing 50 grams or more may take several minutes and many bites; with rodents of 80 to 100 grams, the largest the shrike can kill, the wing flashing is again brought into play.

Niethammer (1937) stated that small animals (birds, mammals, frogs, lizards, insects) are killed by blows with the beak and raking with the claws. In flight, too, as shown by my own observations described earlier, the Great Grey Shrike carries its prey either in its bill or in its feet. Bent (1950) found that it was carried nearly twice as often in the bill as in the claws. On 24th December 1958 I watched one crossing a pond with a vole or large mouse in its beak. Its flight was heavy and swinging until it hovered and quickly transferred the prey to its talons. It may be added that another group of passerines which occasionally seize animal prey in the feet is the crow family. There are records of this for the Carrion/Hooded Crow *Corvus corone* as well as for the Common Crow *C. brachyrhynchos* of America (Bauer 1961, Hulse and Atkeson 1953, Mester 1959, Tönnies 1960).

Both Naumann (1905) and Brehm (1913) said that small passerines were not apparently hostile towards the Great Grey Shrike. Other 'amateur' birds of prey are often not mobbed by small birds and I have watched a Jay *Garrulus glandarius* and a flock of Yellowhammers perching together in the bare branches of a tree in the winter sunshine. Thielcke (1956), describing the Great Grey Shrike's tactics in hunting voles and mice, mentioned that its small and apparently harmless appearance presumably greatly increases its chances of surprising these small rodents. On the other hand, Berck (1951) noted that fledgling Wheatears *Oenanthe oenanthe* flee all birds of prey except the Buzzard *Buteo buteo* and are especially startled by the sight of a Great Grey Shrike. A similar opinion was expressed by Bent (1950) who stated: 'Small birds easily recognize the difference between a shrike and some other harmless bird, and immediately "freeze" in their tracks, or seek shelter in the nearest dense cover.'

But do all small passerines know this enemy instinctively? There have been few systematic enquiries to find out what species are (innately?) agonistic towards shrikes, apart from the experiments of Dancker (1956) who investigated the reactions of a pair of Yellowhammers to dummy Red-backed Shrikes *Lanius collurio*. The fact that some birds react to shrikes as enemies, while others do not seem to be worried by them, could perhaps be explained by differences in individual experience. In other words, it seems likely that such

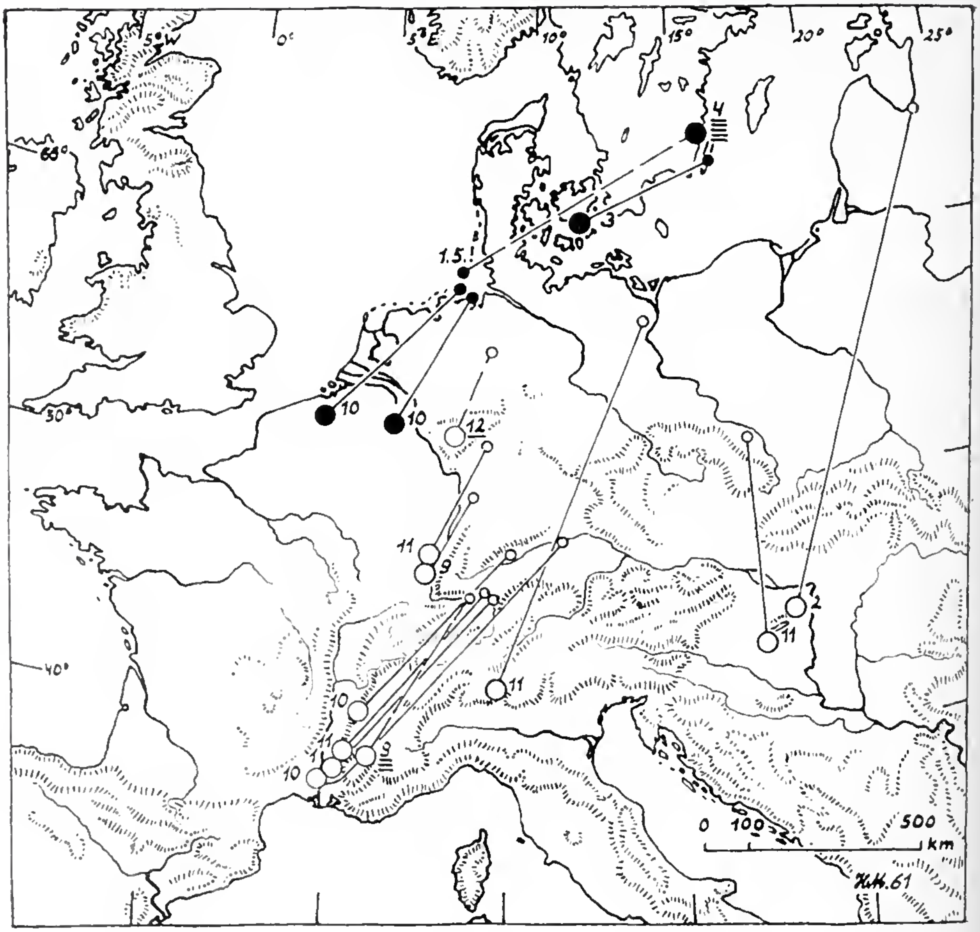

FIG. 1. Map showing migration movements of the Great Grey Shrike *Lanius excubitor* in central Europe (after Schüz 1957). The small and large open circles respectively show the ringing and recovery positions of birds marked as young in the nest; filled circles similarly illustrate birds ringed on migration and recovered in winter. The numbers show the months of recovery and in one case the date of ringing (1st May); this latter record was different in that the bird was ringed on spring migration and recovered over 600 kilometres to the north-east in a subsequent April, whereas the other three migrants were ringed in October and recovered to the south-west in winter. All recoveries were within a year of ringing except those underlined which were respectively one, three and five years later

behaviour is conditioned by learning in most cases and that only a few species possess an innate mechanism which causes them to flee from or attack a shrike. In this connection, the observations of Lind (1962) seem to show that House Martins *Delichon urbica* have a permanent (innate?) hostile reaction to the shape and coloration of the Great Grey Shrike.

Some authors, such as Bannerman (1953), have commented on local fluctuations in the numbers of Great Grey Shrikes. Heyder (1952) noted that the Great Grey Shrike's distribution in Saxony in the winter seemed to be affected by the population cycles of voles and mice. The

Great Grey Shrikes of central Europe, which belong to the northern race *L. e. excubitor*, provide a good example of partial migration, the directions they take being mostly south to south-south-west (see fig. 1); as one might expect, more young than adults seem to migrate. In this connection, Schüz (1957) raised the question whether the Great Grey Shrikes of Europe and Siberia are eruptive, even to a small extent, as are the North American races *L. e. borealis* and *L. e. invectus* to a marked degree according to the density of lemmings *Dicrostonyx spp.* and other small rodents. However, this does not seem to be the case, or at least not to the same extent, as in America. This can probably be explained by differences in food, but little is known about these.

There have been few quantitative studies of the food of the Great Grey Shrike. However, Bayer (1950) analysed 139 pellets which he found below the perches of one of these birds in southern Germany between autumn and the end of January. These showed that even quite late in the year a large number of invertebrates are taken, for they contained the remains of 124 insects (61.4% of all individual items), especially beetles and earwigs as well as grasshoppers, wasps and a hornet; there was also a spider. The vertebrate prey consisted of 76 voles *Microtus* (37.6% of all individual items) and one small bird of unknown species. This sample thus illustrates what I feel sure is normal—that voles form the bulk of the food of the Great Grey Shrike. However, Medlicott (1945) recorded that one in Yorkshire in February and March fed largely on beetles and other insects and a tin of castings he collected consisted almost exclusively of the remains of the large beetle *Ceratophyus typhaeus*. Incidentally, this particular shrike was seen to pursue a Blue Tit *Parus caeruleus* for a hundred yards, even passing through a hay shed, and this chase was evidently successful for the warm body of the Blue Tit was later found spiked on a thorn bush.

Since many small birds are taken at times, there arises the question whether this is the result of individual specialisation (as is well known for some species of birds of prey). On the other hand, of course, all individuals are forced to turn to birds and other alternatives in cold weather when small rodents become scarce. A thin cover of snow may make it easier for the shrikes to catch small mammals, especially *Microtus agrestis* as Leivo (1942) found near Helsinki in Finland, but when these remain hidden by deep snow the shrikes must turn to small birds as their main prey. In such periods of food shortage they can be seen hunting round human habitations, presumably attracted by the birds concentrated around barns and other feeding places. On the edge of Fröndenberg I once saw a shrike capture two Great Tits *Parus major* on a bird table within half an hour. Even so, protracted hard weather evidently causes considerable losses among Great Grey Shrikes (Schüz 1957).

Goethe (1948) drew attention to the strikingly retentive memory for places which is very characteristic of the Great Grey Shrike. Four instances of ringed individuals recovered in the same locality one or two winters later were noted by Schütz (1957), while Tucker (1942) and Boyd (1957) recorded the same individuals occupying territories in Hertfordshire and Cheshire in three and four successive winters respectively. The territorial behaviour of this species even during the cold season and its adherence to fixed winter quarters were demonstrated by the 'removal experiments' of Radtke (1956) who caught an adult female in the same territory at Wilhelmshaven, Germany, on six occasions and released it at distances of 2.5, 6.8, 5.6, 18.2, 15.2 and 37.2 kilometres; only on the last occasion did it fail to return. On the other hand, Bergstrom (1957) had only one rather slow homing success (eight weeks' absence) with five immatures and an adult released at distances of five to eight miles in Connecticut. In the area of Fröndenberg up to three Great Grey Shrikes appear every winter. There, in the pastures and marshy ground beside the river Ruhr the size of the territories they inhabit from October or November to March varies from about 100 to 150 acres (see fig. 2); each is a long strip along the banks of the river and across it and their boundaries are always plainly marked by regular perches. These territories were thus larger than those of 50 to 75 acres which Blume (1957) found in summer and winter in the mountain districts of Hesse.

The Great Grey Shrikes in territories B and C in fig. 2 were probably males as I heard them singing quite often when there was sunny weather in October or early spring. All three territories shown in fig. 2 were occupied for several winters before the four on which the sketch is based, but it seems hard to believe that the same individuals could have been involved throughout. On 14th March 1955, in fact, the feathers of a Great Grey Shrike were found in territory B—the remains of a meal of a Sparrowhawk *Accipiter nisus*.

Only once since 1948 has a pair of Great Grey Shrikes nested in these territories. The earliest autumn records I have are of two birds on 29th September 1958, one flying along the ditches south of the river and the other resting in the north of territory B, but these were both migrants and not winter visitors. In 1953 and again in 1955 a winter visitor arrived in territory B on 1st October. During 1957-62, when I made observations in greater detail, I recorded the following dates for the occupation of territory B:

? November 1957 to 1st March 1958
11th October 1958 to 27th February 1959
13th October 1959 to 14th February 1960
23rd October 1960 to 4th March 1961
15th October 1961 to 8th March 1962

According to skulls I found in the pellets of Barn Owls *Tyto alba*,

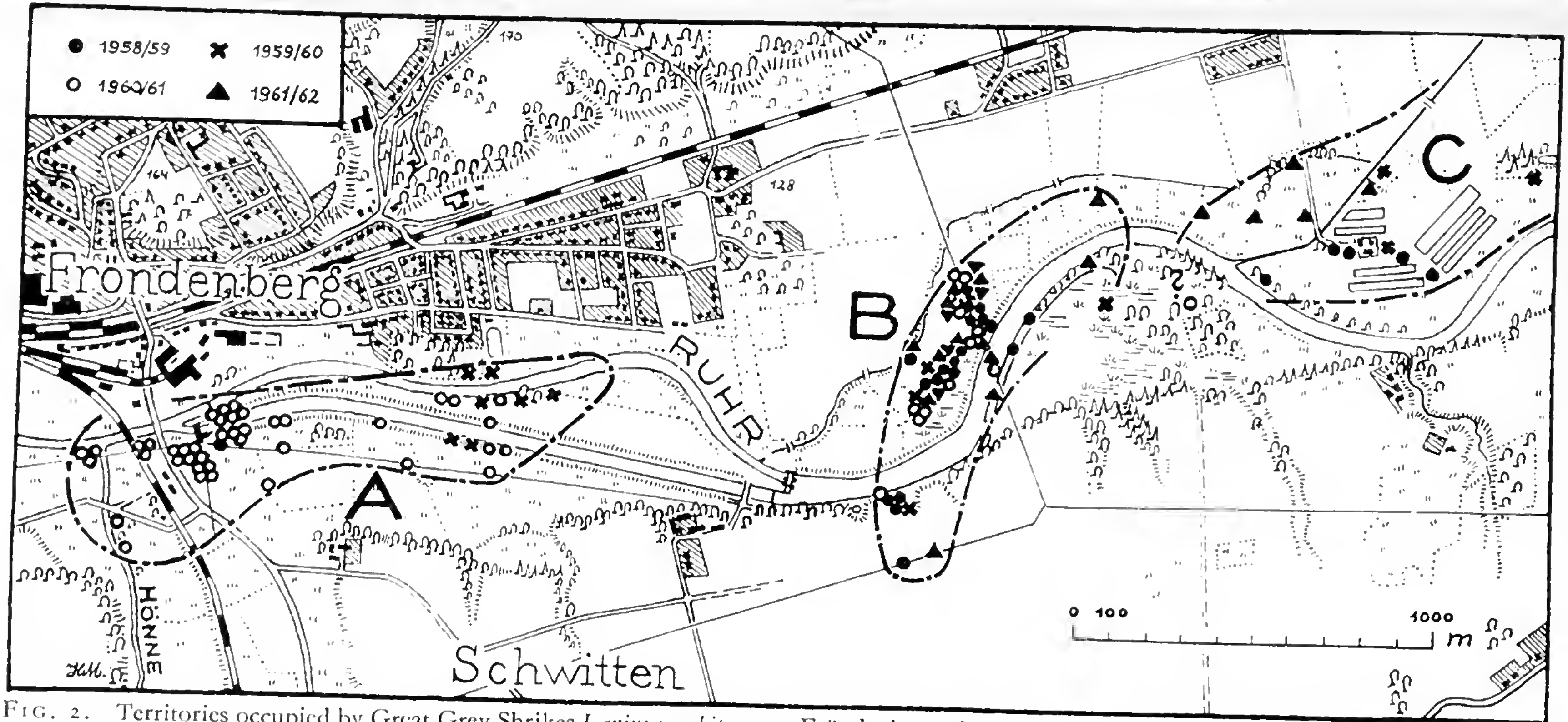

FIG. 2. Territories occupied by Great Grey Shrikes *Lanius excubitor* near Fröndenberg, Germany, in four successive winters. It is believed that during these four winters the same individuals were involved. Territory A consisted chiefly of pastures and the grass-covered embankment of a ditch, with only small shrubberies. Territory B was a swampy meadow with, in the part preferred by the shrike, a long hedge of hawthorn, some oaks and a high ash; at the western border of this territory, on the southern bank of the river, is the only place where the species has bred in this area since 1948 (this was in May 1956, but the hunting grounds of the breeding pair were not the same as those of the wintering birds). Territory C consists of water storage areas, as occupied in two other places a few miles along the valley of the Ruhr during recent winters

Little Owls *Athene noctua* and Tawny Owls *Strix aluco* during the winter of 1961/62, the commonest small mammals in the area of the three territories in fig. 2 seem to have been the Common Vole *Microtus arvalis*, the Field Vole *M. agrestis* and the Common Shrew *Sorex araneus* in a ratio of about 5:1:1, followed by the Yellow-necked Field Mouse *Apodemus flavicollis*, the House Mouse *Mus musculus*, the White-toothed Shrew *Crocidura russula* and the Harvest Mouse *Micromys minutus*.

The tendency for birds of prey and owls to prey particularly on abnormal and unfit animals has been discussed by Curry-Lindahl (1961), Eutermoser (1961) and Rudebeck (1950-51) among others. My own observations show that the Great Grey Shrike exerts a similar selective influence by reacting to prey which is slow to escape.

ACKNOWLEDGEMENTS

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Notes

Somersaulting during bathing by geese and swans.—K. E. L. Simmons's account of Canada Geese *Branta canadensis* somersaulting during bathing (*Brit. Birds*, 58: 58-60) prompts me to record similar behaviour by four other species of geese and swans.

During January and February 1954 I spent several days at Cley, Norfolk, watching and photographing a group of four swans which consisted of an adult Whooper *Cygnus cygnus* and a pair of Bewick's Swans *C. columbianus* with one juvenile. One afternoon when this

group was on the water about 20 yards in front of my hide, all four started bathing in the normal manner with head-ducking and wing-scooping movements under the surface and much splashing and beating of wings. Suddenly one of the adult Bewick's Swans up-ended and fell over on to its back with its black paddles kicking in the air. It righted itself quite quickly and I took this to be an accident, but then the Whooper Swan did exactly the same thing, finally turning sideways on to its back and coming up the right way. Afterwards, both continued to bathe normally before the whole group retired to some shallows to preen. In contrast to the Canada Geese described by K. E. L. Simmons, these swans were not seen to dive or remain submerged.

I have also several times seen similar bathing behaviour by captive Emperor Geese *Anser canagicus* and Brent Geese *Branta bernicla* on a pool in front of my house. Quite frequently these geese have completed the somersault and at other times they have come up sideways. I have seen both species dive and remain completely submerged for several seconds during bathing, both before and after somersaulting as well as when there has been no somersaulting at all.

PHILIP WAYRE

[In this connection, K. E. L. Simmons has drawn our attention to a recent paper by Dr. F. McKinney on 'The comfort movements of Anatidae' (*Behaviour*, 25: 120-220, especially 171-178), which bears out the comments he himself made in his note on Canada Geese somersaulting. Dr. McKinney states that there are three main bathing movements—head-dipping, wing-thrashing and somersaulting—all of which form part of what he calls 'thorough bathes'; he also mentions diving and says that somersaulting, both complete and incomplete, occurs in most species of Anatidae, though there is no evidence that it is ever a 'display'.—EDS.]

'Feeding hygiene' among wading birds.—M. J. Hudson's note on the rotating of resting Curlew *Numenius arquata* (*Brit. Birds*, 57: 467) prompts me to place on record another habit that is probably widespread, but to which I have not seen any published references.

In East Africa I have noticed that several species of birds that feed by wading in shallow water habitually leave the water to defaecate on land, afterwards returning immediately to their feeding zone. I have observed this habit in Wood Sandpiper *Tringa glareola*, Greenshank *T. nebularia*, Marsh Sandpiper *T. stagnatilis*, Curlew Sandpiper *Calidris testacea*, Black-winged Stilt *Himantopus himantopus*, Hammerkop *Scopus umbretta*, Yellow-billed Stork *Ibis ibis* and African Spoonbill *Platalea alba*.

The habitats around Tabora in Tanzania where these observations have been made are shallows at the edges of reservoirs, flood waters and river backwaters—in other words, inland non-tidal areas. Incidentally, in tropical regions 'feeding hygiene' could well reduce the incidence of infection by endoparasites, such as trematodes, whose larvae have to reach a suitable intermediate host by swimming through water, since larvae in faeces on land would soon be killed by exposure to the sun. JOHN REYNOLDS

[The suggestion put forward by Mr. Reynolds is extremely interesting, though we do not see how there could be any natural selection against 'insanitary' individuals.—EDS.]

House Martins and Swallows diving at human being.—On 15th June 1965, at a reservoir near Gravesend, Kent, I suddenly felt a rush of wings and looked up to see a House Martin *Delichon urbica* passing no more than two feet above my head. I thought little of it, however, and was turning to look at the reservoir again when suddenly about fifty House Martins and Swallows *Hirundo rustica* started diving at my head from all angles. This continued for about ten minutes, the birds swooping together in a loose flock, first from one side and then, after flying on for about 75 yards and turning, from the other. The House Martins came closer than the Swallows and one in particular seemed to fly in level with my head and then suddenly to shoot up obliquely when about only two yards away. After a few minutes they ceased to fly as a group and began to dive from all sides, which was quite disturbing although they never touched me. They were definitely diving at me and not hovering over my head for insects as these species and Swifts *Apus apus* sometimes do. G. F. CULLEN

[In spite of Mr. Cullen's impression at the time that feeding was not the cause of this curious behaviour, it does not seem explicable on any other grounds. Hirundines in general and Swallows in particular not infrequently follow people and animals through grassland, and even more in desert country, for the insects disturbed by their passing. In these circumstances they regularly swoop past just above ground level and often only inches away, carrying on beyond for a distance of 50 to 100 yards and then turning and swooping back again in the manner described by Mr. Cullen. In this case, as the observer was standing still and the birds were diving at his head rather than his legs, there can have been no question of his disturbing insects from the ground, but it seems not impossible that these House Martins and Swallows were diving at a swarm of minute midges concentrated, as often happens, above his head.—EDS.]

Feeding method of Rook with deformed bill.—On 11th April 1965, at Swindon, Wiltshire, I watched a Rook *Corvus frugilegus* which had its upper mandible at least one-third longer than normal and sharply decurved; its lower mandible was straight and projected slightly to the right of the upper. Such deformities are well known and were extensively reviewed by D. E. Pomeroy in his paper on 'Birds with abnormal bills' (*Brit. Birds,* 55: 49-72), but most of the small number of descriptions of feeding behaviour which he was able to summarise (pp. 63-68) involved food picked off flat surfaces. This Rook, on the other hand, dug with its upper mandible until it exposed something edible which it could hook out on to the open ground; it then turned its head to the right and, in the recognised manner for birds with elongated bills, picked the food up between the sides of its mandibles. Its general condition appeared to be good and the only difference that I could see when comparing it with another Rook near-by was that its bare face-patch seemed smaller, which perhaps simply meant that it was younger. G. L. Webber

Female Blackbird catching newts.—With reference to Mrs. J. Atkinson's recent note (*Brit. Birds,* 58: 151), I should like to record a similar case reported to me by Mrs. N. A. Peterken, in whose garden at Ruislip, Manor Middlesex, a female Blackbird *Turdus merula* was several times seen to take newts from a small pond during May 1964. The method of capture was slightly different from that described by Mrs. Atkinson in that the bird stood on the edge of the pond, watching intently, until a newt surfaced, whereupon it would peck at it and throw it clear of the water on to the lawn. There it dealt with the wriggling animal as if it were a worm before taking bits of it to a box bush *Buxus sempervirens* where it had a nest with young. Although it was not possible to prove that the bits of newt were fed to the young, the evidence certainly suggests it.

Mrs. Peterken tells me that she has recorded only the Smooth Newt *Triturus vulgaris* in her pond and she considers that this was the species taken by the Blackbird. Bryan P. Pickess

Reviews

Die Vögel Deutschlands (Artenliste). By G. Niethammer, H. Kramer and H. E. Wolters. Akademische Verlagsgesellschaft, Frankfurt am Main, 1964. xv+138 pages. DM 14.80.

A modern check-list of German birds has been needed for some time and this need has been brought out more clearly by the publication of corresponding lists by most of Germany's neighbours in recent years.

In compiling the present list two special difficulties have had to be faced. One of these is, of course, the definition of the area to be covered in view of the frontier changes which have occurred since the First World War. The authors meet this by using the frontiers of 1937 except in the case of records since 1945 where the Oder-Neisse line is taken as the eastern limit. The other difficulty arises from the fact that German popular names of birds have many local variants. Continuity has been secured here by using in general the same popular names as in G. Niethammer's *Handbuch der Deutschen Vogelkunde* (1937-42). The order and scientific names adopted are based upon J. L. Peters's *Check-list of Birds of the World* (as continued by his successors and completed down to familial level by Ernst Mayr and J. C. Greenway, Jr, in *Breviora*, 58: 1-11). Innovations not yet generally accepted are given in foot-notes.

Breeding birds are divided into (1) residents (including partial migrants), (2) summer visitors, (3) irregular breeders and (4) former breeders. Regular visitors and passage birds are likewise classified as (1) species which are represented throughout the year but do not breed, (2) summer visitors which do not breed, (3) winter visitors and (4) passage birds. Birds which are not recorded annually are either (1) irregular visitors, (2) occasional visitors or (3) stragglers. Special attention has been devoted to giving numerical expression to the frequency with which birds occur although, of course, it is realised that usually only rough approximations can be arrived at. In this the authors follow the example of the Dutch check-list. Breeding species are therefore divided into six categories, ranging from 'very rare, 1-100 pairs' to 'common, over 500,000 pairs'. Regular visitors are split up into five classes from 'in very small numbers, 1-100' to 'very numerous, over 100,000'. Birds which are not recorded annually are either 'stragglers (exceptionally), 0-15 since 1900', 'occasional, 15-30 since 1900' and 'irregular, more than 50 since 1900'; details of at least the more recent records are given for species in the first two categories of this class.

In actual fact it is, of course, not possible to give even approximate figures for most species, but some of those available are of considerable interest. Even taking into account the limited nature of the German coast and the fact that much of it borders the Baltic, it seems rather surprising that, while five species of shearwater *Procellaria spp.* have been recorded, the total number of individuals concerned amounts only to about 26! It is pleasant to learn that Germany still has considerable numbers of some declining species. Thus about 6,600 pairs of Herons *Ardea cinerea* bred in 1960-61 and there were still about 4,800 pairs of White Storks *Ciconia ciconia* in 1958. Though the Golden Eagle *Aquila chrysaëtos* is now confined to the Bavarian Alps and reduced to between eight and ten pairs, there are still 80 pairs of

White-tailed Eagles *Haliaëtus albicilla* and 60 pairs of Ospreys *Pandion haliaëtus*. About 800 Great Bustards *Otis tarda* still survive.

A weakness of the work is the lack of adequate information about changes in status in recent years. Though we are given some details of those relating to a few species, the general impression received is that no such changes are taking place so far as the great majority are concerned. The experience of other European countries in recent years suggests that this is unlikely to be correct. While a number of records are relegated to foot-notes on the grounds that the birds concerned are most likely to have escaped from captivity, some of those admitted without comment to the text must surely have had a similar origin. Thus it is difficult to believe that the example of Schrenk's Little Bittern *Ixobrychus eurhythmus* accepted as constituting the sole German (and European) record could have arrived in Europe of its own accord since this is a species which breeds in China and Japan and winters in the East Indies. Moreover, one's suspicions of this bird are strengthened by the fact that neither the locality in which it was obtained nor the date is known with certainty. The three records of Demoiselle Cranes *Anthropoides virgo*, one in 1837, one (apparently regarded as not quite certain) in 1862 and one in 1963, must be regarded in a similar light, particularly the last. A number of 19th century records from Heligoland are given only in foot-notes and no doubt the great majority of the many which remain in the text are quite authentic. One cannot, however, but have doubts about one or two of these latter, particularly those relating to the *twelve* Cretzschmar's Buntings *Emberiza caesia* which are supposed to have been obtained there before 1900. There are no subsequent records for Germany nor, it would seem, any others for Europe outside the Mediterranean area.

But these are minor blemishes in a work which will be of great value to those wishing to obtain a general picture of bird distribution in Germany. Some records are of particular interest to British ornithologists. Thus the first Cetti's Warbler *Cettia cetti* for Germany was recorded from 30th April to 14th May 1961, almost the same time as the first for Britain, and the first German Red-flanked Bluetail *Tarsiger cyanurus* was reported on 9th October 1956, about the same date as the third British record. Such instances, which could be multiplied, show that what at first sight appear to be isolated, 'accidental' records of rarities are in fact often part of a wider pattern due to changes in distribution or habit. D. D. HARBER

Where the World is Quiet. By Roland Williams. Witherby, London, 1965. 224 pages; 16 colour photographs; end-paper maps. 30s.

Increasingly threatened in their bid for a market by a flood of glossy compendiums and fact-bulging guides, ornithological adventure books

have had some rather lean years recently. At times it has seemed that deriving nothing but pleasure and excitement from seeing birds has been branded non-productive and therefore unworthy. Happily, however, birds never fail to demolish such attitudes and Mr. Williams's book makes it clear that, for him, their chase and occasional capture on film are sufficiently rewarding.

The main theme of the text is composed of accounts of six journeys in search of birds through the islands of Britain (from Lundy north to Unst) and in Iceland, Lapland and Spitsbergen. Each chapter follows a similar pattern, the journey being described in every stage from initial plans to return departure. Also included are liberal and informative asides on many subjects other than the avian quarry. The reason for the latter is that Mr. Williams clearly enjoys most experiences in life and, by successfully communicating them, he avoids the pitfall of dreary specialisation that haunts more serious writers. However, in a book presumably intended mainly for his fellow bird-watchers, the weight of ornithological content is surprisingly light. Fully to arouse an appetite by an extremely well-set table and tasty aperitifs and then to serve only small helpings is to disappoint.

The book's second theme, the evolution of Mr. Williams's photographic equipment through many openly admitted trials and tribulations, suffers from a similar dénouement. Apart from a beautiful portrait of a Gannet, his photographs possess only one attraction—remarkable atmosphere. Otherwise, compared with the high standard of other British photographers, as it must be, his work can only be accounted mediocre. The apparent use of black ink to increase definition and contrast in two plates seems to represent a particularly depressing attempt at post-exposure correction.

As a cheerful guide to places far and near, this book succeeds, and anyone thinking of following Mr. Williams's paths will find it useful. Beyond this, it will entertain collectors of personal sagas, but is likely to sustain few others.

D. I. M. WALLACE

News and comment

Edited by Raymond Cordero

N.A.T.O.-sponsored pesticides study.—An Advanced Study Institute on 'Pesticides and their Effects on Wildlife', sponsored by the North Atlantic Treaty Organisation, was held at Monks Wood Experimental Station, Huntingdonshire, from 1st to 14th July. The main purpose was to enable those working on the effects of pesticides on wildlife to exchange ideas and to discuss future research. The thirty-four papers were concerned with the background of the wildlife problem and with field and laboratory studies of the effects of pesticides in terrestrial, freshwater and marine environments. Seventy-one scientists from government and

university laboratories attended the meeting, including chemists, toxicologists and zoologists of eleven nationalities. The British Trust for Ornithology and the Royal Society for the Protection of Birds were represented.

The papers and discussions showed that pesticide residues have been detected in a wide spectrum of physical and biological samples from diverse environments, indicating that contamination is widespread. In some instances, harmful effects on wildlife populations were clearly demonstrated, but more frequently the effects of residues are unknown. It was agreed that more work was needed if the effects of pesticides were to be fully understood, including routine collection of data, experimental research, the use of present knowledge, and the dissemination of information.

A Breckland film.—Philip Wayre's new film, 'A Wind on the Heath', which records the wildlife of the unique Breckland, has its première at the Royal Festival Hall at 3 p.m. on Sunday 3rd October in aid of cancer research. The film will also be shown in Norwich on 6th October and in Birmingham on 25th October. It will be supported by two other short films, one of which deals with the work of the Ornamental Pheasant Trust. Mr. Wayre, who is the director of the Norfolk Wildlife Park, will be accompanied at the film shows by his tame Eagle Owls.

Tragic death of Jonathan Sparrow.—We have learned with deep regret that Jonathan Sparrow was killed in a cliff fall while ringing birds on Lundy on 22nd June. He was acting as warden of Lundy Bird Observatory for this one year before going up to university in October. His work there and previously on Cape Clear Island and in the B.T.O. Ringing Office at Tring showed that he had considerable potential and his many friends will mourn his loss to ornithology.

Scottish Wildlife Trust appointment.—Bernard Gilchrist, M.A., Conservator of Forests in Tanzania, has been appointed full-time secretary-organiser of the Scottish Wildlife Trust; he takes up his post this month. The Trust, whose membership is nearing 600, hopes to have established several local nature reserves in time for the National Nature Week next April.

Release of marked Monarch Butterflies in Britain.—As part of a long-term study of the orientation of the migrant Monarch Butterfly *Danaus plexippus*, it is planned to release several hundred from Canada in western and central England during mid-September. These butterflies will be tagged with a special adhesive label. Any sightings should be reported; if a marked specimen is captured in good condition it is desirable to release it after noting the details on the label and the date and place of capture. Details of sightings or captures should be sent to John Burton, B.B.C. Natural History Unit, Broadcasting House, Bristol 8.

Recent reports

By I. J. Ferguson-Lees

(These are largely unchecked reports, not authenticated records)

This summary covers the rarer species in June, July and August (though information for the last of these months is still coming in and so the picture is not yet complete). It thus follows on after the one published in August (*Brit. Birds*, 58: 351-352).

As usual, June continued the pattern of late April and May. There were again vagrants from both southern and northern Europe and, more surprisingly, from America. In the last category were a male **White-throated Sparrow** *Zonotrichia albicollis* trapped on Walney Island (Lancashire) on the 17th and released on the 18th;

an adult female **Wilson's Phalarope** *Phalaropus tricolor* at Scaling Dam (Yorkshire) on the 20th and 21st—the eighteenth British and Irish record in twelve years, but only the third in full summer plumage—and what was probably the same individual at Ogston (Derbyshire) on the 23rd and 24th; and the second British record of a **Pied-billed Grebe** *Podilymbus podiceps* (*cf.* 58: 305-309). The last, an adult in summer plumage, was found near Harrogate (Yorkshire) on 9th June and was still in the same place at the end of August, by which time another had appeared in Somerset (see later). It is perhaps not irrelevant to add that a juvenile Pied-billed Grebe which came on board a ship off Venezuela and travelled by this means to Liverpool is now in Chester Zoo.

Northern species which are not particularly expected in June included **Sabine's Gulls** *Xema sabini* in Kent and Dorset; a belated **Iceland Gull** *Larus glaucoides* inland in Yorkshire on the 16th; and a total of three, possibly four, **Snowy Owls** *Nyctea scandiaca* on various islands in Shetland, particularly Whalsay and Fetlar. One or more of the last had been present since mid-April (58: 352) and it is interesting that this was the third successive year of summering by this species in Shetland; another pair was also seen regularly this summer on the Scottish mainland. Scandinavian and east European birds likewise included a surprising mixture of ones which do not normally come here until August or September. For example, Fair Isle (Shetland) produced a **Bluethroat** *Cyanosylvia svecica* on the 1st, an **Icterine Warbler** *Hippolais icterina* on the 8th, and also a female **Scarlet Grosbeak** *Carpodacus erythrinus* from the 9th to the 13th; while Spurn (Yorkshire) had a female **Red-breasted Flycatcher** *Muscicapa parva* on the 6th. Another Red-breasted Flycatcher, a male this time, appeared on Whalsay (Shetland) on the 24th and 25th, and there was also an Icterine Warbler at Voxter (Shetland) on the 26th. **Ospreys** *Pandion haliaëtus* were quite widely seen from Shetland south to Yorkshire and Staffordshire, while reports of **Honey Buzzards** *Pernis apivorus* included one in Shetland from the end of May.

Shetland continued to make the headlines by producing what was only the second Scottish record of a **Firecrest** *Regulus ignicapillus* at Lerwick from 11th June into July, a remarkable date for this species, and a female **Little Bittern** *Ixobrychus minutus* at Loch of Seatness near Sumburgh from the 3rd to the 10th—not to mention an immature male **Golden Oriole** *Oriolus oriolus* at Seatness on the 6th (other Golden Orioles were reported in East Anglia and Hampshire at this time). Fair Isle also had more than its share of southern birds. These included a **Purple Heron** *Ardea purpurea* from the 17th to the 22nd—only the fifth Scottish record and the first since 1917. There was also a **Woodchat Shrike** *Lanius senator* there up to the 7th, when it was heard singing, and another at Spurn on the 5th. Male **Black-headed Buntings** *Emberiza melanocephala* were recorded on Whalsay for about a week at the beginning of the month, on Skokholm (Pembrokeshire) on the 3rd, and on Fair Isle on the 29th and 30th. (May and June are perhaps the most likely months for this south-east European summer visitor to overshoot and reach Britain, but escapes from captivity are always an alternative possibility as we are constantly reminded by the steady trickle of sightings of the much more commonly imported **Red-headed Bunting** *E. bruniceps*, June reports of which included a male at Fair Isle on the 17th.) Thus much of the emphasis at this time was on the north of Scotland, but there was also a **Little Egret** *Egretta garzetta* and a **Great Reed Warbler** *Acrocephalus arundinaceus* at Stodmarsh (Kent) on the 12th, and other Great Reed Warblers at Selsey Bill (Sussex) on the 6th and at Frensham (Surrey) from at least the 12th to the 19th.

July produced very little by comparison with June, but particularly interesting were the reappearance of a male **Serin** *Serinus canarius* at Cambridge for several days from the 5th (*cf.* 58: 351) and the arrival of another at Portland (Dorset) on the same day. Other vagrants in July included a **Roller** *Coracias garrulus* near Llandovery (Carmarthenshire) on the 4th and 6th; a male **Little Bittern** at Oxwich Marsh (Glamorgan) on the 14th (the second year running that this species has appeared there); and a **Little Egret** on the Llanfaelraeth estuary (Anglesey) from the 25th to at

least 7th August. Reports of **Spotted Crakes** *Porzana porzana* included one at Chew Valley Lake (Somerset) throughout the second half of July. America was represented by the **Pied-billed Grebe** still in Yorkshire and by the discovery of an adult male **Yellow-headed Blackbird** *Xanthocephalus xanthocephalus* at Seaton Burn (Northumberland) from 23rd July to at least mid-August; the likelihood of its being an escape is being explored. **Ospreys** included one in Glamorgan and another in Caernarvonshire, but what was widely publicised in national newspapers as an Osprey shot in Co. Leix at the end of July was, in fact, a **Honey Buzzard.** Interesting sea-birds included the autumn's first two **Cory's Shearwaters** *Procellaria diomedea* off Spurn on the 10th; a **Long-tailed Skua** *Stercorarius longicaudus* in the colony of Arctic Skuas *S. parasiticus* on Fair Isle on the 13th and 15th; a second-summer **Mediterranean Black-headed Gull** *Larus melanocephalus* far inland at Westhouses (Derbyshire) on the 18th; and a notable tern at Sandwich Bay (Kent) on the 28th and 29th. The last, which was well seen, was identified as a **Royal Tern** *Sterna maxima*, but the description is perhaps more suggestive of a **Lesser Crested Tern** *S. bengalensis*.

As already stated, the August picture is still incomplete, but a number of interesting reports have come in. It is already proving another good autumn for **Melodious Warblers** *Hippolais polyglotta* with a total of four as far east as Dungeness (Kent) and others in Dorset, Scilly, Co. Cork and up the Irish Sea to the Calf of Man and Walney Island. **Icterine Warblers** were also reported at several places on the east coast from Shetland to Lincolnshire and at Cape Clear Island (Co. Cork). **Aquatic Warblers** *Acrocephalus paludicola* have become a regular feature of this month in recent years and first-winter birds were trapped at Chew Valley Lake (Somerset) on the 14th and at Stanpit Marsh (Hampshire) on the 14th and 24th. Other warblers identified included a **Bonelli's Warbler** *Phylloscopus bonelli* at Portland (Dorset) from the 10th to the 20th; **Barred Warblers** *Sylvia nisoria* at Spurn on the 14th, and at Fair Isle on the 16th (four), 20th and 27th; and **Arctic Warblers** *Phylloscopus borealis* at Hauxley (Northumberland) and near Weston-super-Mare (Somerset) on the 15th and 17th. The last and the mid-month Barred Warblers formed part of a significant fall of Scandinavian night migrants on the east coast, as did a **Red-breasted Flycatcher** at Spurn from the 14th to the 16th and the Icterine Warblers already mentioned, but that fall was utterly dwarfed at the beginning of September by a most spectacular movement of this type which seems to have been on an even bigger scale, at least in East Anglia, than those in 1956 and 1958 (*Brit. Birds*, 52: 335-377). This will be dealt with in a future summary when the information is more complete.

Huntingdonshire came surprisingly into the news in mid-August when a **Black-winged Stilt** *Himantopus himantopus* stayed at Diddington Reservoir for a week or more from the 17th and a **Pratincole** *Glareola pratincola* appeared at St. Ives on the 22nd. Other southern species at this time were an **Alpine Swift** *Apus melba* at Ballycotton (Co. Cork) on the 6th and 7th; adult **Woodchat Shrikes** near Marloes (Pembrokeshire) on the 9th, on Fair Isle on the 12th, and at Portland on the 29th (thus continuing the 1964 and 1965 reversal of the recent decreasing trend among occurrences of this species); a **White-winged Black Tern** *Chlidonias leucopterus* at Queen Mary Reservoir (Middlesex) on the 22nd; a male **White-spotted Bluethroat** *C. s. cyanecula* at Ewhurst (Surrey) on the 30th; and a male **Black-eared Wheatear** *Oenanthe hispanica*, only the third record since 1956, at Cley (Norfolk) from the 31st into September. American vagrants included the first **Pectoral Sandpipers** *Calidris melanotos* of the autumn in Cornwall and Belfast; a **Lesser Yellowlegs** *Tringa flavipes* on the Inner Ribble Marshes (Lancashire) on the 11th and 12th; a **Stilt Sandpiper** *Micropalama himantopus* at Wisbech sewage-farm (Lincoln/Norfolk border) for the second time in three years; and another **Pied-billed Grebe** at Chew Valley Lake (Somerset) from the 17th onwards.

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Certain conventions of style and layout are essential to preserve the uniformity of any publication. Authors of papers in particular, especially of those containing systematic lists, reference lists, tables, etc., should consult the ones in this issue as a guide to general presentation. English names of species should have capital initials for each word, except after a hyphen (e.g. Willow Warbler, Black-tailed Godwit), but group terms should not (e.g. warblers, godwits). English names are those used in *The Handbook of British Birds*, with the exception of the changes listed in *British Birds* in January 1953 (46: 2-3). The scientific name of each species should be underlined (but not put in brackets) immediately after the first mention of the English name. Subspecific names should not be used except where they are relevant to the discussion. It is sometimes more convenient to list scientific names in an appendix. Dates should take the form '1st January 1965' and no other, except in tables where they may be abbreviated to '1st Jan.', 'Jan. 1st', or even 'Jan. 1', whichever most suits the layout of the table concerned. It is particularly requested that authors should pay attention to reference lists, which otherwise cause much unnecessary work. These should take the following form:

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Tables should be numbered with arabic numerals, and the title typed above in the style used in this issue. They must either fit into the width of a page, or be designed to fit a whole page lengthways. All tables should be self-explanatory.

Figures should be numbered with arabic numerals, and the captions typed on a separate sheet. All line-drawings should be in indian ink on good quality drawing paper (not of an absorbent nature) or, where necessary, on graph paper, but this must be light blue or very pale grey. It is always most important to consider how each drawing will fit into the page. The neat insertion of lettering, numbers, arrows, etc., is perhaps the most difficult part of indian ink drawing and, unless he has had considerable experience of this kind of work, an author should seek the aid of a skilled draughtsman.

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THREE SHILLINGS AND SIXPENCE

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Some radar measurements of the altitude of bird flight

By E. Eastwood and G. C. Rider

(Plates 60-63)

INTRODUCTION

The sensory equipment of a bird must be capable of monitoring its three-dimensional flight manoeuvres in order to supply control information equivalent to the data provided to a human pilot by the usual flight instruments. We are not concerned in this paper with the navigational instruments, but only with the altimeter or altitude fixing device, since it is our purpose to study the bird's behaviour in the vertical plane.

The altitude control problem is an intriguing one. Why do migrating birds so frequently climb to altitudes of many thousands of feet, when such high altitudes would appear to be unrelated to the needs of the journey to be made and seem only to involve a wasteful expenditure of energy? It has been argued that the migrating bird climbs to an altitude such that it will not run any risk of meeting high ground; it has also been suggested that the choice of high altitudes during nocturnal migration is to avoid the mist which may be encountered at lower levels. It is when we find birds climbing to an altitude of a few thousand feet in order to cross the North Sea or the plains of the middle west in the United States, locations where there is clearly no question of the presence of high ground likely to impede their progress, that it would appear necessary to look for some other explanation of the apparent choice of such an altitude for migratory flight. Does the bird indeed 'choose' an altitude, and, if so, how and why? Closely linked with these questions is the equally significant one of the means by which the bird is apparently able to keep altitude during an extended night flight over the sea. The circumstances which prompt a change in the bird's flight profile behaviour are equally interesting and worthy of

close examination: for example, Lack (1963a) has shown how birds will descend to lower altitudes when a rain shower is encountered at night.

It will be seen that a study of the altitudes at which birds fly raises some very important questions concerning their flight behaviour. Although the significance of altitude studies has long been recognised, the accumulation of a volume of accurate altitude data sufficient to permit detailed study was hardly possible with the visual techniques that alone were formerly available. It is true that useful general observations of the behaviour of birds in flight can be made through field glasses, but only a comparatively small proportion of the birds airborne at any time may be observed in this way, while nocturnal flights are almost completely inaccessible to the visual observer. The moon watching experiments of Lowery (1951) and his school are a notable exception, but this type of observation is necessarily very limited in scope and the method is too laborious to allow the collection of a large volume of data. Moreover, none of these ground-based visual techniques permit accurate measurement of the altitudes of birds in flight to be made. Even synchronised observations made through theodolites located at the extremities of a measured base line hardly yield reliable data and the method is tedious and uncertain. Nevertheless, useful data on bird altitudes have been acquired visually and perhaps the most informative summaries are those by Meinertzhagen (1955) and Mitchell (1955, 1957, 1964). Many of the former's records and all the latter's involve sightings of identified species from aircraft. The frequency of such aeroplane sightings, however, is too low to yield a body of information on altitude that can form the basis of an adequate statistical analysis. It was in fact the limitation of the direct visual method of assessing the heights of migrating birds that permitted the erroneous conclusion to be drawn by Meinertzhagen that the majority of migratory flights take place at altitudes less than 1,000 feet. Perhaps the most spectacular of such direct sightings of birds from aircraft was that described by Weitnauer (1956) who observed Swifts *Apus apus* at an altitude of 3,000 feet in the beam of a searchlight carried by the aircraft in which he was flying in order to investigate their nocturnal flight habits. Sutter (1957) clearly pointed out that even the daylight operation of precision optical equipment derived from the military would not provide the data required for a thorough analysis of altitude behaviour.

The application of radar methods of bird observation to the height finding problem during the last few years has completely transformed the situation. A modern height finding radar can measure the altitudes of aircraft or birds accurately; it is also possible to study changes in altitude during an extended flight and to make observations by night as well as by day. The usefulness of the radar method of height

determination was foreseen by Sutter (1957) who made some altitude observations on birds in the beam of the 3-centimetre Precision Approach Radar at Zurich airfield, although he did not attempt a systematic height study.

The radar equipment installed at the Meteorological Office Research Station at East Hill, Bedfordshire, included a medium powered 10-centimetre nodding height finding radar which was used by Harper (1958) to show that the most probable height for bird migration flights in that region of the country was between 2,000 feet and 3,000 feet. The spread in height of the birds was quite wide and radar heights up to 5,000 feet were of frequent occurrence. Altitudes between 5,000 feet and 10,000 feet were much less frequent and only a few observations were made of birds above 10,000 feet, although the maximum height which he recorded was at 16,000 feet. The maximum height observed by Houghton and Coultas (1958) for a spring movement of birds in the region of Great Malvern was 9,500 feet; they also noted that most of the birds were located at altitudes below 4,000 feet.

In 1958-59, using an S-band height finder of greater power than had previously been employed for this type of work, Lack (1960a) made measurements of the height of bird migration over the North Sea off Norfolk. Although no systematic height measuring programme throughout the year was attempted, observations taken on the March/April easterly flow of passerine winter visitors, which is the principal feature of the spring pattern of migration in this region, showed that the most frequent height varied between 2,000 feet and 5,000 feet. Observations during the 1958 autumnal arrivals of these passerine visitors suggested a tendency for lower heights compared to the spring movements; a tendency to fly higher by night than by day was also noted. Lack also reported some small passerines in September 1959 flying by day over land in a south-south-west direction at 21,000 feet. Height measurements on Lapwing *Vanellus vanellus* suggested that many wader movements occurred between 3,000 feet and 6,000 feet, such movements taking place within a height bracket of 2,000 feet, in contrast to the rather broad spread of heights which was the pattern of the passerine migration. These observations prompted Lack to ask how migrating birds maintain their height and whether they depend on visual height estimation only or possess some special adaptation.

The height of nocturnal migration over Cape Cod, Massachusetts, U.S.A., has been studied by Nisbet (1963a) using a similar radar apparatus to that employed by Lack but with the addition of photographic recording of the height display. Observations were taken during 1961 on 37 nights during the months of April (three), May (seven), September (17) and October (ten) and 22,000 echoes were examined. The observations were made about three to four hours after sunset when the most frequent height of migration was found to

lie between 1,500 feet and 2,500 feet above sea level, while 90% of the birds were below 5,000 feet. Observations at 20.00 hours and 22.00 hours suggested that the average height at the earlier hour was about 10% lower than at the later time. Nisbet considered that a substantial portion of his observations related to small passerines and suggested that these birds tend to migrate higher than most larger species. His highest recorded altitudes were 15,000 feet to 20,000 feet, and these he attributed to shore birds migrating directly across the Atlantic to and from eastern South America and the Lesser Antilles.

A different method of radar height measurement was employed by Bellrose and Graber (1963) in their study of nocturnal migration over the state of Illinois, U.S.A. Their apparatus was an airborne type of radar operating on a wavelength of 3 centimetres. This radar produced a 3° beam which was caused to scan around the vertical at an angle of 60° so as to produce an annular cone of cover. The overflying birds intersected this cone at two points and so the directions of flight of the birds could be deduced as well as their altitudes from the photographic records which were taken. The low power of the transmitter limited the observations to ranges below 7,000 feet, while the duplexer characteristics of the equipment also tended to suppress the echoes from birds at ranges below 1,500 feet; in spite of these apparatus limitations, useful distribution histograms were derived and showed a tendency for a most frequent altitude of about 2,500-3,000 feet. One useful advantage of the Bellrose and Graber technique was the immediate indication of the presence of cloud or overcast which was given by the 3-centimetre radar so that the changed altitude distribution assumed by the birds in response to cloud obscuration of the star-field could be directly observed.

Since comprehensive radar records of bird migration around the south-eastern region of England have been compiled and studied over a number of years (e.g. Lack 1959, 1960b, 1962, 1963a and b; Tedd and Lack 1958; Lack and Eastwood 1962; Eastwood and Rider 1964), it appeared to be worthwhile to complement these plan position movements with a detailed radar study of the altitude of bird flight in the same region. The results of the altitude research programme executed by the writers in fulfilment of this objective are detailed in the present paper. It was considered necessary to extend the work over a complete cycle of one year so that it would be possible to detect any seasonal effects consequent upon the changing directions of migrant flow. The pattern of altitude behaviour which emerges from this investigation makes interesting comparison with the results of the workers in America.

Although we have made radar altitude measurements from 1958 onwards, the main results of the present paper are based upon 20,000 measurements over the period May 1962 to May 1963. It should be

noted that these observations relate to the heights of 'angels' (i.e. the altitude of a radar reflection centre which appears as a definite echo upon the plan position indicator or p.p.i.). Such a single angel usually consists of a flock of birds containing a number of individuals which varies with the species, the season and the time of day.

APPARATUS

To estimate the height of a bird or aircraft by radar requires the measurement of both the slant range of the object from the observer and also the angle of elevation above the earth's surface. Plate 60 shows one type of height finding radar which was used in the present investigations. This is a high powered 10-centimetre radar which produces a fan beam of radiation whose width is 1° in the vertical plane and 4° in the horizontal plane. This beam is caused to swing up and down in the vertical plane by the mechanical nodding of the aerial and so the beam may be swept over any airborne object, be it cloud, aircraft or bird. The radar echo thus produced is displayed at the appropriate range and altitude on a cathode ray tube termed the 'Range Height Display' as in plate 61b.

In order to observe an aircraft by the height finding radar it is necessary to adjust the bearing of the equipment so that the plane of sweep of the radio beam contains the target whose altitude is to be

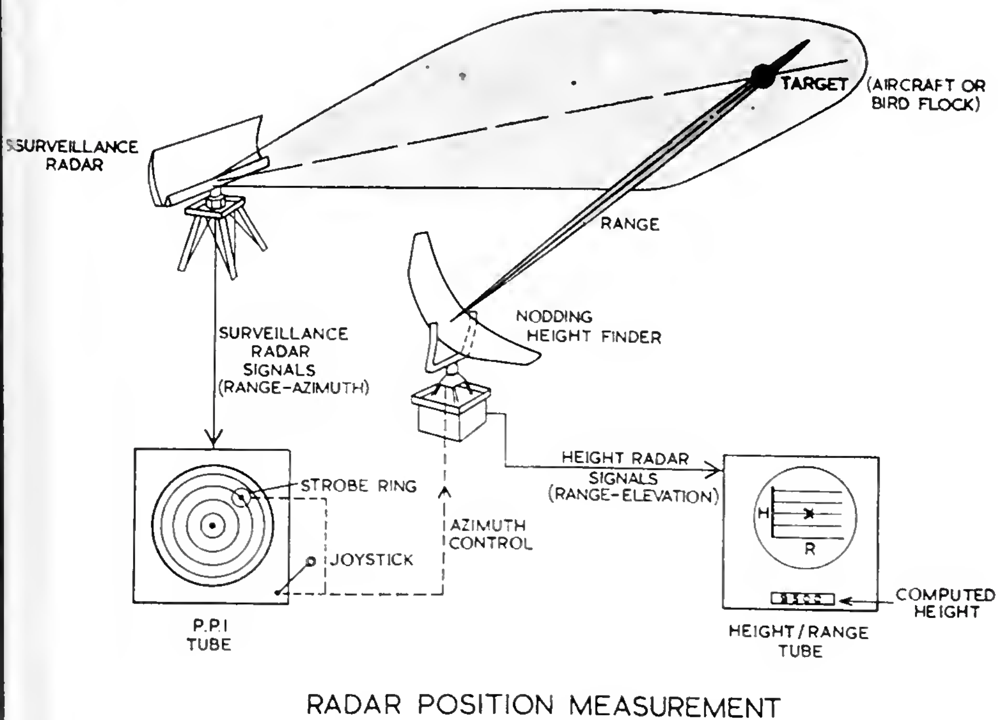


FIG. 1. Electronic azication. The strobe ring and the height finder azimuth are both controlled by the joystick. The height finder can thus be pointed at a selected target on the plan position indicator (p.p.i.) display tube of the surveillance radar

measured. The process of measurement is illustrated in fig. 1. The radar p.p.i. picture is shown on the left of fig. 1. All objects in the airspace which are seen by the surveillance radar located on Bushy Hill, Essex, are shown in their correct map positions relative to the radar station. The arrow indicates a small circle or strobe marker which can be superimposed upon any target of interest by the manipulation of a small joy-stick. This electronic device controls the azimuth of the height radar and the act of strobing a target on the p.p.i. causes the height radar to take up the bearing of the target, a process which is termed 'electronic azication'. The radar echoes from all targets swept by the beam of the height radar are now displayed upon the range/height tube, but the target of interest on this display is identified by the small arrow head which is electronically coupled to the strobe of the p.p.i.

In the illustration shown in plate 61a the bird flock identified by the ring strobe on the p.p.i. is at a range of 51 miles; the arrow on the R/H tube in plate 61b identifies the altitude of the target and corresponds to a height of 10,000 feet. A small electronic computer is associated with the display and performs the calculation for altitude from the range and angle of elevation almost instantaneously; the appropriate corrections for earth curvature and the refraction effect in the atmosphere are also inserted. Such a combination of radars with electronically coupled control and display equipment permits target

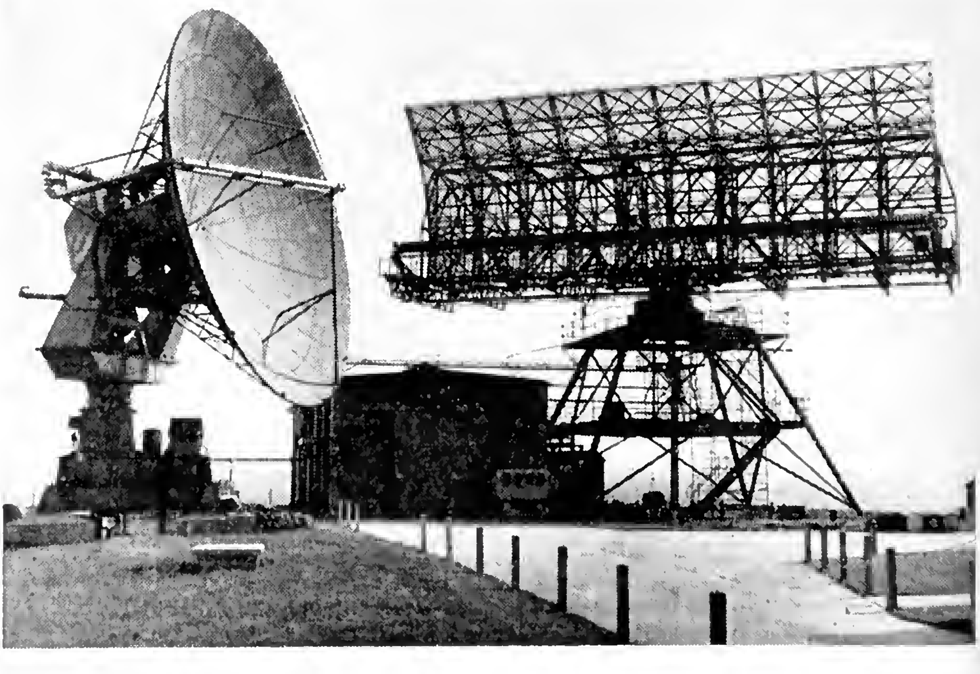


FIG. 2. Radar tracker used for most measurements (left) and surveillance radar (right)

heights to be measured quickly and accurately, but the photographic method of recording to be described is probably more suited to the present purpose as the possibility of statistical bias in the operator's selection of targets is then avoided.

A large proportion of the height measurements quoted in this paper

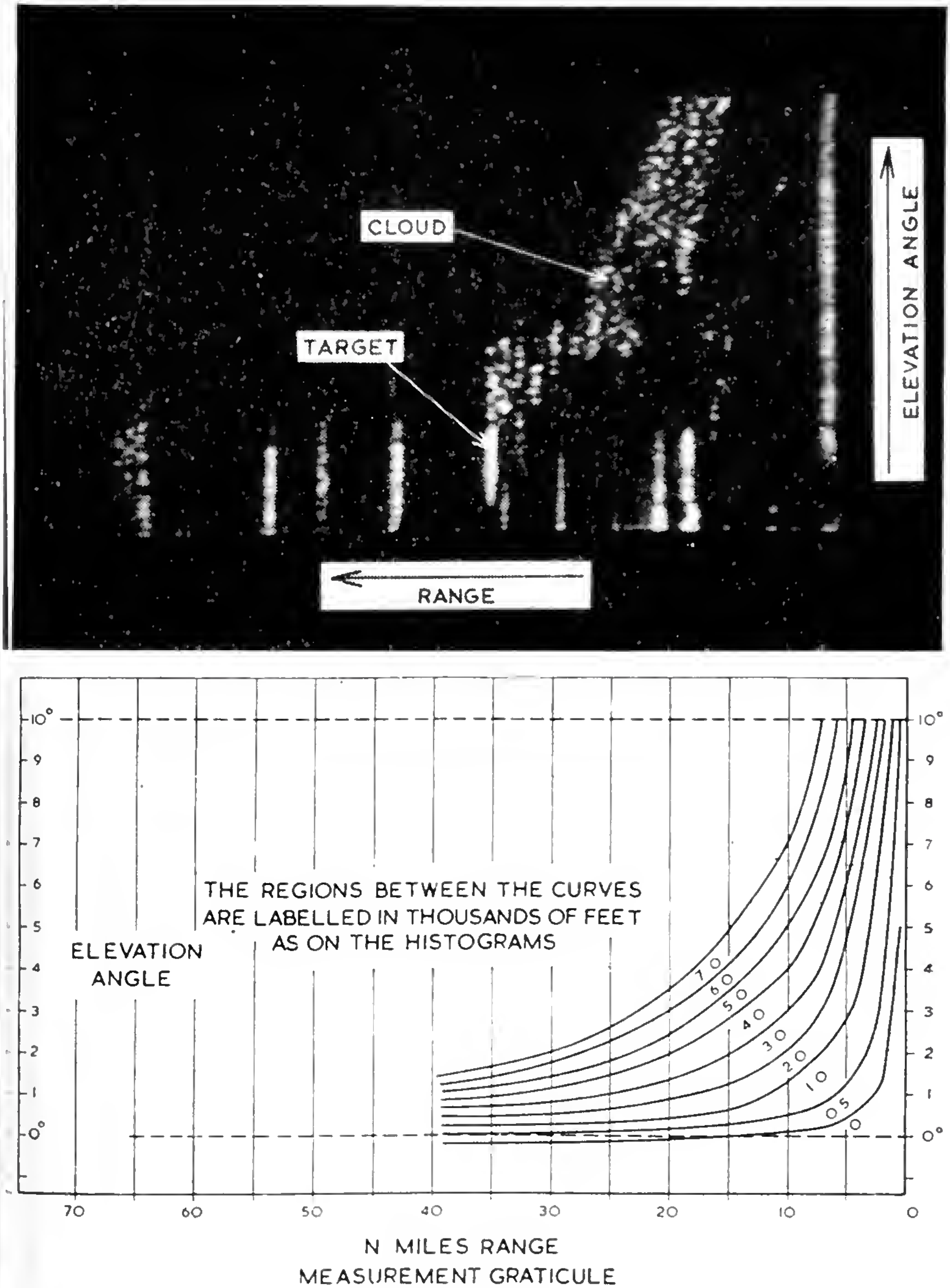


FIG. 3. (a) Tracker range height display and (b) measurement graticule on to which the picture is projected for analysis

were made with the aid of the equipment shown in fig. 2. This radar-tracker consists of a circular paraboloid of 30-foot aperture which can be tilted about a horizontal axis and so causes a 2° beam of 23-centimetre radiation to be swept up and down in a vertical plane. The echoes resulting from such a scan are displayed upon a cathode ray tube and photographed as in fig. 3a. Large numbers of such records were measured by optical projection of the echoes onto the height chart of fig. 3b and supplied the data employed in the present paper. As fig. 2 clearly shows, the radar-tracker was located close to the surveillance radar and so both radars were operated from the same site at a height of 250 feet above sea level. These two radars shared the same transmitter on a wavelength of 23 centimetres so that the circumstances of the radar observations on the two equipments were strictly comparable. The radar was equipped with the M.T.I. facility, i.e. moving target indicator, so that bird targets well below 1,000 feet, which are normally obscured by the ground clutter, could also be observed and their altitudes measured.

A third method of height estimation by radar can sometimes be usefully employed, which makes use of the form of the radiation diagram associated with the surveillance radar aerial of fig. 2; this technique is discussed later in connection with the hard weather movements of Lapwings.

'DAY/NIGHT' EFFECT

Systematic measurements of angel heights were taken over the year May 1962 to May 1963 and were made both by day and by night. The distribution of the measurements over the observation period is shown in table 1. It will be noted that the numbers of height measurements made during each month follow closely the general activity distribution given by Lack (1959).

Table 1. Distribution of height observations through the year

Month	Number of dates observed	Number of day observations	Number of night observations	Total observations
June 1962	16	618	439	1,057
July 1962	14	415	542	957
August 1962	6	157	740	897
September 1962	4	509	346	855
October 1962	7	1,236	669	1,905
November 1962	7	2,724	1,541	4,265
December 1962	3	514	137	651
January 1963	3	540	136	676
February 1963	6	1,117	586	1,703
March 1963	11	2,506	2,258	4,764
April 1963	3	553	634	1,187
May 1963	9	1,193	242	1,435

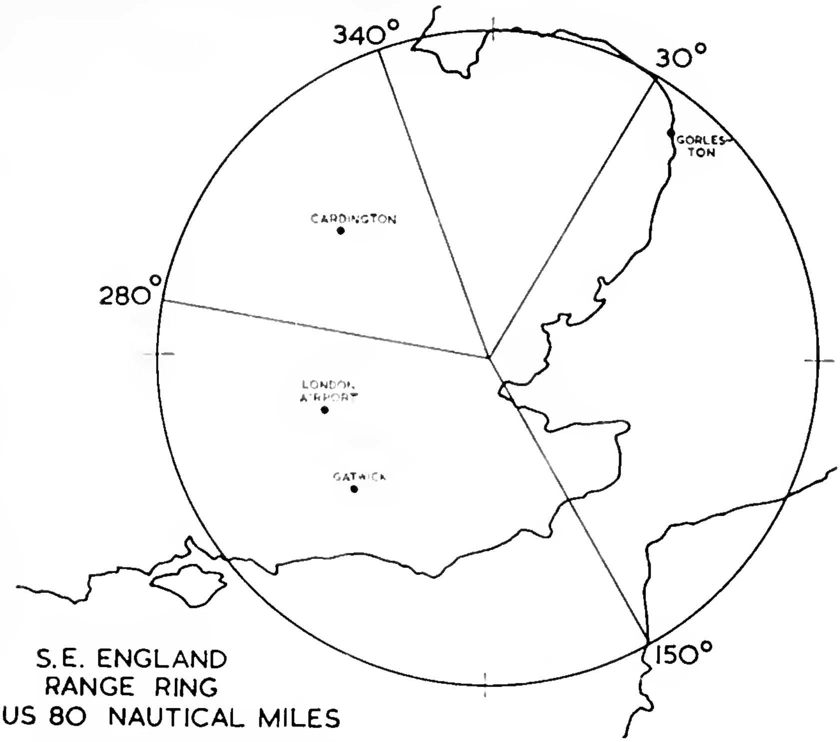


Fig. 4. Outline map of south-east England showing azimuths and meteorological stations mentioned in text

The height measurements were made along azimuths selected at 10° intervals. It will be seen from fig. 4 that the measurements taken to the east of the station refer in general to bird movements over the sea (i.e. to migrants moving between the Continent and this country). The overland measurements include the random flights of resident birds as well as the migrants.

The analyses of the bird altitude distributions which were derived from all the measurements during the year of observation are shown in fig. 5. In this figure altitude measurements during the hours of darkness have been separated from the daytime results, but no distinction has been made between overland or oversea effects. In order to facilitate comparison of the histograms presented in this paper a normalised method of plotting has been adopted whereby the abscissae of the extremities of the horizontal rectangles of the histogram correspond to the percentages of the total number of measurements which fall in the successive 1,000-foot height intervals. Thus the envelope of the rectangles approximates to the altitude distribution function. Altitude intervals of 250 feet, 500 feet and 750 feet have been adopted for the lower layers in order to show with more precision the shape of the distribution function near to the ground. This detailed treatment was made possible by the use of the M.T.I. facility already mentioned.

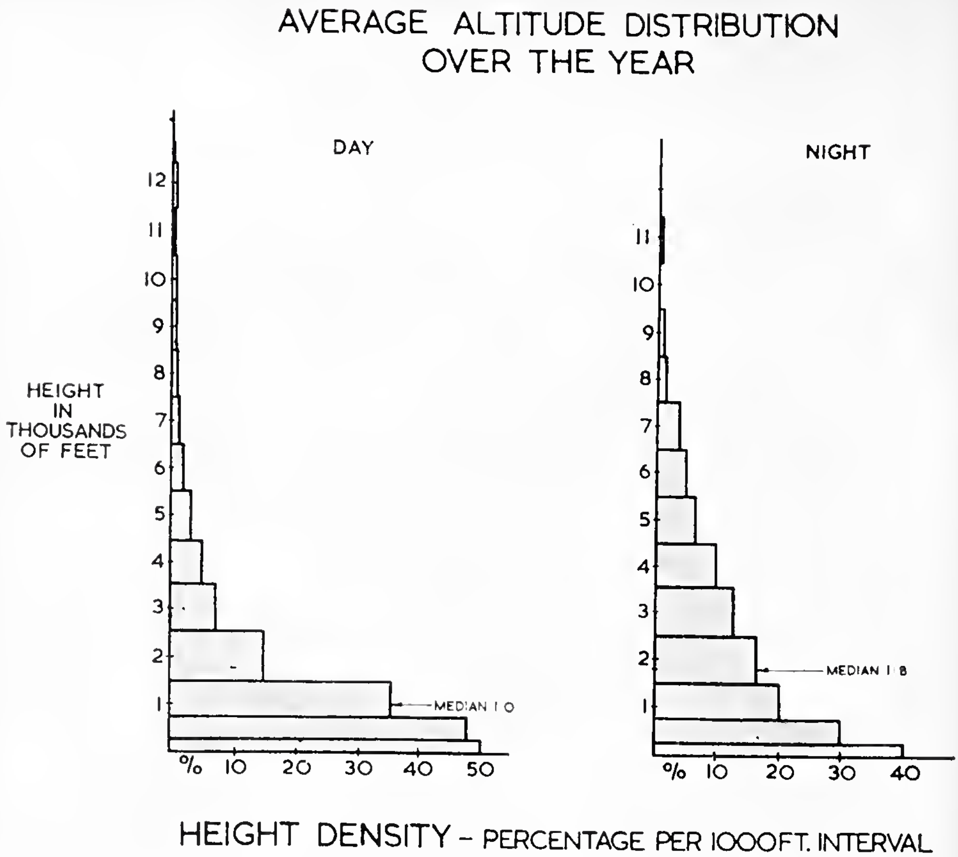


FIG. 5. Average altitude distribution over the year

It will be seen that the centre of gravity of the night histogram occurs at a higher altitude than that corresponding to the daytime histogram and so demonstrates a tendency for the birds to fly higher by night than by day. Otherwise expressed, 80% of the birds at night fly below 5,000 feet, but during the day 80% fly below 3,500 feet—so that the day to night altitude effect is a significant one. On the other hand, the maximum night altitude recorded was 11,000 feet compared with a corresponding daytime figure of 14,000 feet. It is interesting to note that Nisbet (1963a) reported 90% of his Cape Cod nocturnal migrants below 5,000 feet, so that there is a tendency for some of the North Sea birds to fly at a slightly higher altitude. Substantially all the birds are below 10,000 feet in both regions.

In these histograms for the year as a whole there is no tendency for the distribution to peak at a preferred range of altitudes; the smoothing achieved by addition of all the year's results is clearly too great and masks the monthly variations; the presentation also tends to favour the low altitude component which is present throughout the year. In this first simple treatment of the results, no segregation by species nor direction of flow has been made.

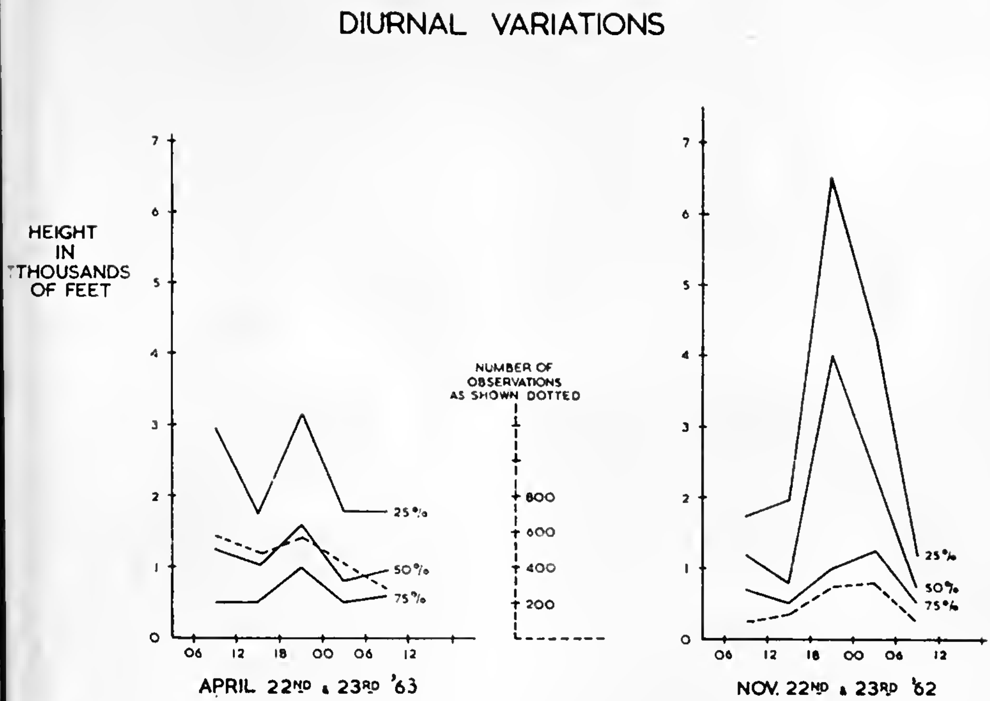


FIG. 6. Diurnal variations. The full lines show the height exceeded by 25%, 50% and 75% of the measurements; and the dotted line marks the number of observations

DIURNAL VARIATIONS OF HEIGHT

In order to study in more detail the form of the daily change in altitude distribution, certain days were selected for analysis on which the radar station operations had permitted the systematic recordings of height throughout the twenty-four hours. The altitude distributions were compiled for consecutive six-hour time intervals and the three heights extracted which corresponded to the altitudes exceeded by 75%, 50% and 25% respectively of the observations taken during the interval. These heights have been used to prepare the two diagrams in fig. 6, which correspond to 22nd/23rd November 1962 and 22nd/23rd April 1963 respectively, these days being reasonably representative of winter and spring conditions. These diagrams clearly show a tendency for low altitudes to be flown in the afternoon with maximum altitudes being achieved in the period before midnight. The altitude becomes lower after midnight. Nisbet (1963a) measured heights on the south-westerly flow of migrants off Cape Cod at 20.00 hours and 22.00 hours and noted that the mean height for the later hour was about 10% greater than the height at 20.00 hours; this same relative change is also roughly fulfilled on the 25% height curves of fig. 6.

The dotted lines of fig. 6 indicate the number of height observations made within the successive six-hour time blocks. These curves provide an indication of the variation of angel density; they also give a

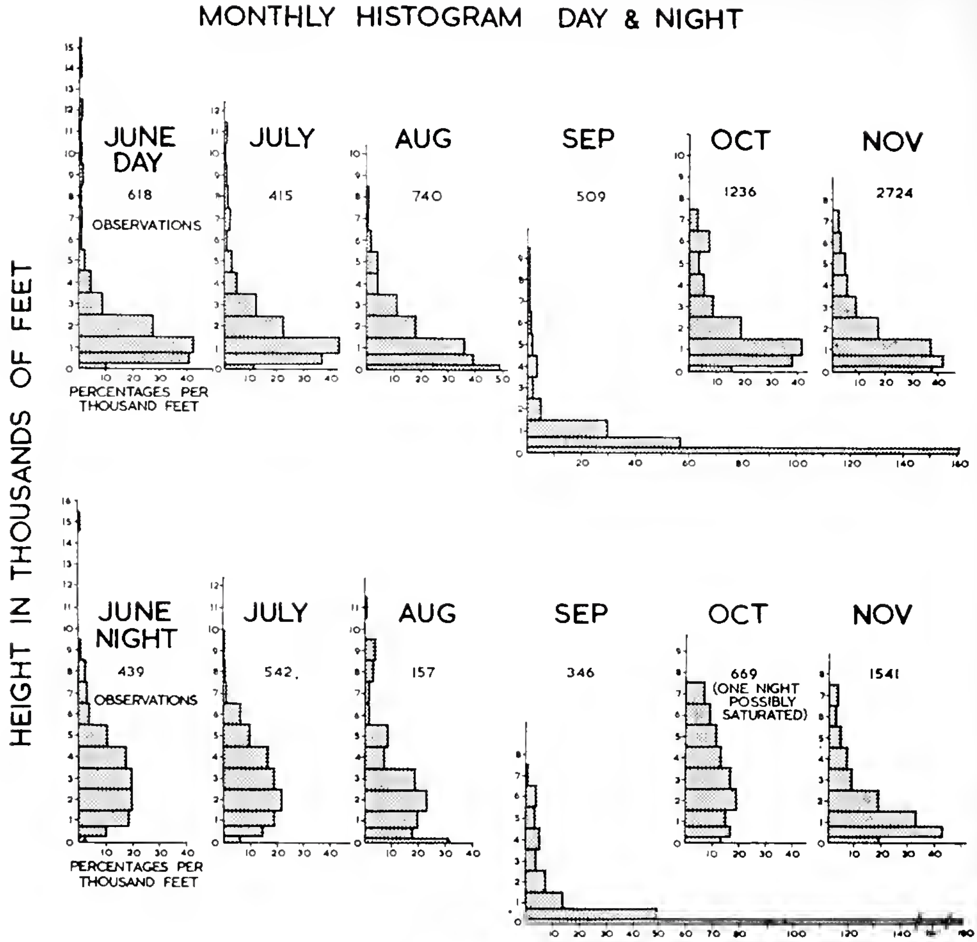
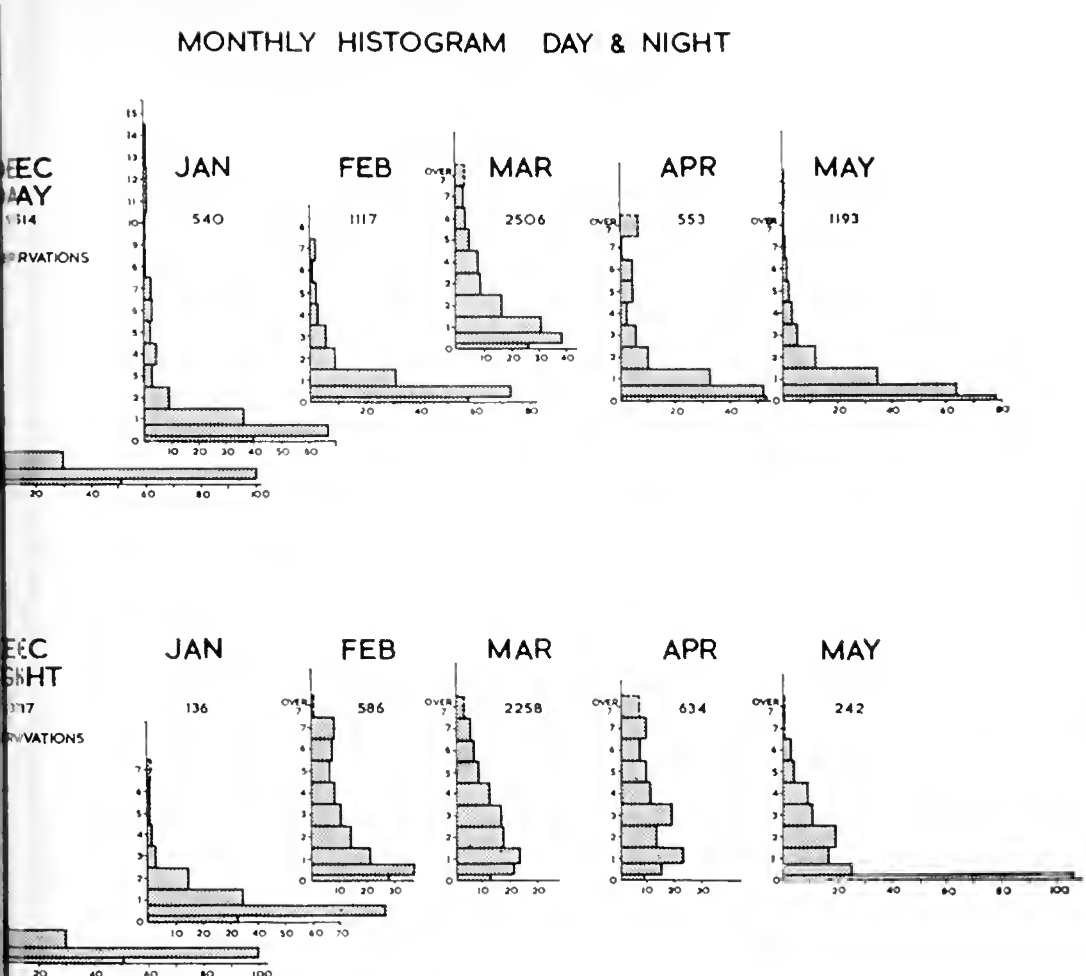


FIG. 7. Average monthly altitude distributions during 1962-63

measure of the significance to be attached to the plotted points. The correlation with height is striking and suggests that as the intensity of migration increases towards midnight, in accordance with the diurnal pattern described by Tedd and Lack (1958), so these later birds tend to fly at higher altitudes. Similar diagrams prepared for the westerly-moving streams of November and January clearly show that lower altitudes are flown then than during the easterly movements of February, March and April; this is discussed later.

MONTHLY VARIATION IN ALTITUDE DISTRIBUTION

The monthly results are shown in the series of histograms presented in fig. 7, and the considerable variations between them will be noted. Thus the histograms for June and July suggest a most frequent altitude of 1,000 feet by day and 2,000 feet by night; 81.5% of the day-time altitudes for June are below 2,500 feet compared with 78% of the night observations falling below 4,500 feet, so that the higher altitude of the night flights in June is again clearly established. In November



on the other hand, the most frequent altitude is in the order of 1,000 feet for both the day and the night distributions; in that month, 75% of the daytime measurements fall below 2,500 feet while the corresponding night-time figure is 70%, so that the night-time altitude only slightly exceeds that for the day.

COMPARISON OF AUTUMN AND SPRING ALTITUDE PATTERN

The scatter in the monthly pattern is quite large and can easily obscure the persistent seasonal differences. Doubtless this is attributable to the wide variations in weather conditions which prevailed on the randomly selected observational days. Nevertheless, it is of interest to compare the altitude distributions for the periods corresponding to the arrival of the winter visitors from the Continent (i.e. the westerly movements of October and November) with the distribution for February and March when these same winter visitors are flying eastwards to their Continental breeding grounds. Certain identification of the bird species by radar means alone is, of course, impossible, but the appearance of the echoes of the p.p.i. coupled with estimates of

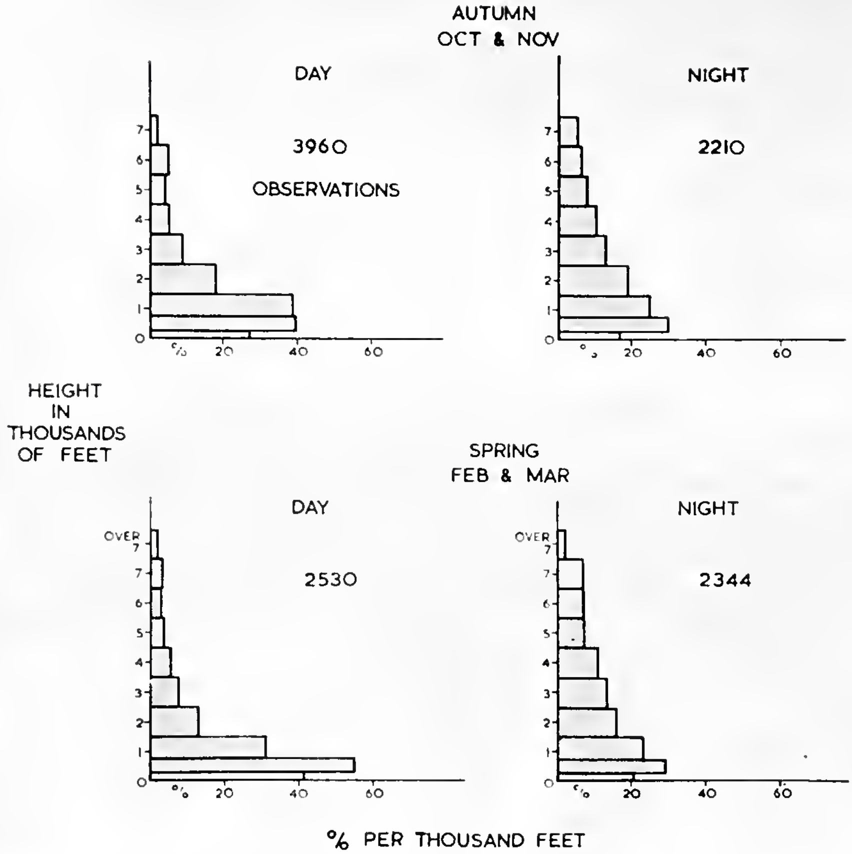


FIG. 8. Autumn-spring comparison for all observations

speed of flight suggest that passerines of moderate size, such as Chaffinches *Fringilla coelebs*, were mainly involved. Although Starlings *Sturnus vulgaris* were certainly involved in the daytime movements (Lack 1962), it is most unlikely that they figured in the night distribution since other radar studies on the Starling suggest that true night movements of this species are most infrequent (Eastwood, Isted and Rider 1962). The resulting autumn and spring distributions are shown in fig. 8. Fortunately, the number of observations in each of the classes of fig. 8 are roughly comparable so that equal weights may be attached to the four histograms. The day and night effect as discussed above is once more apparent and holds for both the autumn and spring movements, as shown in table 2.

Table 2 shows very clearly that, while the daytime altitude for the spring movements is significantly higher than for the reversed direction of flow in the autumn, the night altitude in the spring is substantially higher than the night altitude in the autumn. Fig. 9 illustrates the same general effect; the autumn/spring histograms are given for movements to the west only in the autumn and to the east only in the spring, in general with following winds and observed within the sector

Table 2. Percentage of altitudes above 2,500 feet by day and night in spring and autumn

	Day (from fig. 8)	Night (from fig. 8)	Day and night (from fig. 9: well directed movements)
Autumn	25%	30%	25%
Spring	31%	52%	40%

0°-100° (in other words, fig. 9 refers only to well oriented migratory movements). Bellrose and Graber (1963) showed that the altitudes of their south-bound migrants of the autumn were slightly greater than those flown by the north-bound migrants of the spring.

In looking for an explanation of these diurnal and seasonal changes in the altitude of flight of migrants it seems natural at first to suppose that the main effect must be attributed to species differences. A contribution from this cause to the night/day effect is undoubtedly present, but its influence ought to be small when a comparison is made of the spring/autumn altitudes for the east-west movements across the North Sea, since it is highly probable that we are concerned with roughly the same communities of birds in the two cases. In this connection, however, the age difference between the two communities may be significant, i.e. the westerly streams of the autumn contain the young birds engaging in their first migration to winter quarters. The average age of the easterly stream of the spring must be approximately six months older than the westerly stream of the preceding autumn, notwithstanding the possibly selective mortality of the winter months; it would thus appear reasonable to assume that the flight capability of the

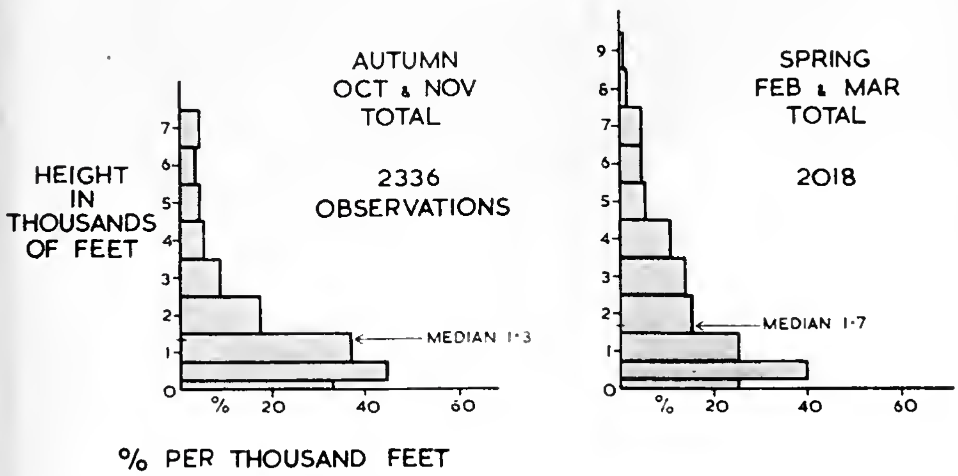


FIG. 9. Autumn-spring comparison, for typical movements only, in sector 0° to 100° (see fig. 4)

more mature spring community might be superior to that of the autumn, and so would be likely to achieve the higher altitudes which are in fact observed. It has also to be remembered that height measurements were taken upon the early phase of emigrant flights but upon the concluding portion of immigrant movements. Such explanations of the spring/autumn altitude ratio are pure speculation, however, and so it is more profitable to consider other possible contributory factors, such as the influence of wind, cloud cover and temperature.

INFLUENCE OF WIND SPEED AND DIRECTION UPON THE MEAN ALTITUDE OF MIGRATION

In order to test whether the direction and speed of the wind are factors contributing to the altitude distribution differences revealed in the autumn and spring comparison of fig. 8, the same set of measurements were used to prepare figs. 10a and 10b, account now being taken of the wind state in the region of the observed movements. The altitude distributions were derived for a number of observational days when clearly defined migrant streams were identifiable on the p.p.i. The

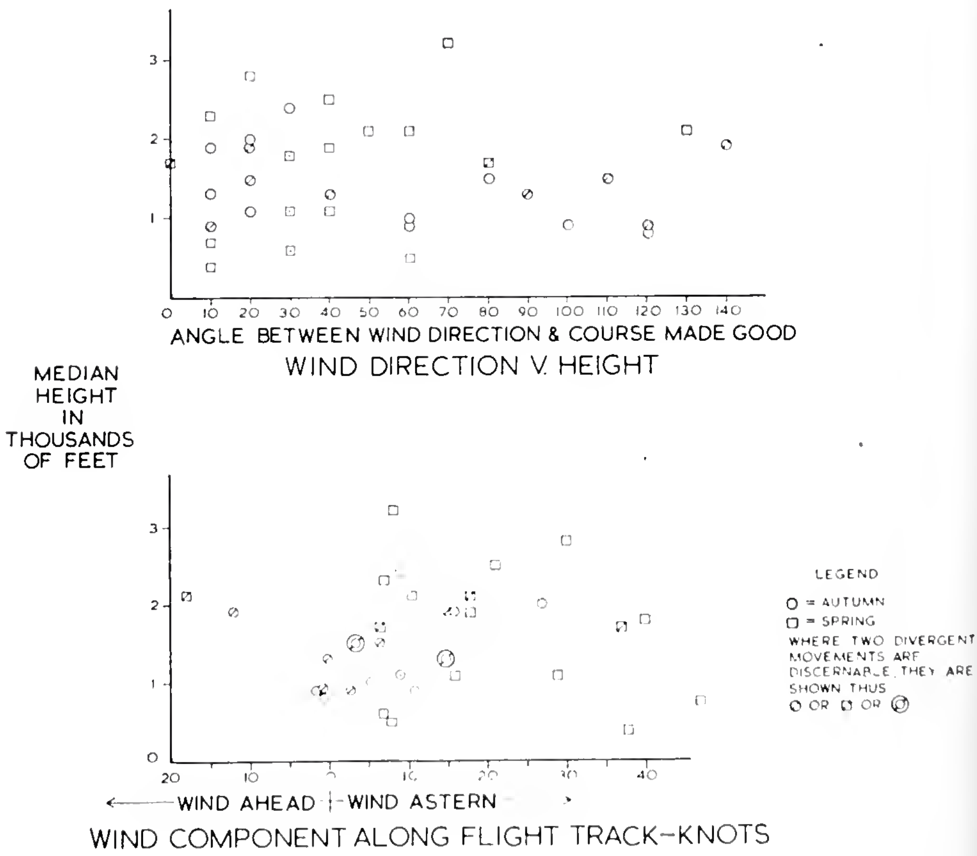


FIG. 10. The influence of (a) wind direction and (b) wind speed upon the altitude of migration

median height and the percentage of heights above 2,500 feet were extracted. In order that the analysis should be as free as possible from any ambiguity of interpretation, the observations were limited to the westerly and easterly streams of the spring and autumn respectively and the height measuring area was confined to the sea region in the sector 0°-100°. In fig. 10a the median heights of the altitude distributions corresponding to the various observation periods are plotted against the angle of divergence of the average track of the migration movement from the wind direction at 900 metres as given by the Hemsby Meteorological Station which is conveniently close to the region in question. Some of the observing periods showed two streams of migrants to be present in the sector; for these occasions both angles have been plotted against the same median altitude, as the legend to fig. 10a makes clear.

It is unfortunate that the spring observations refer almost exclusively to following winds, indeed the diagram as a whole is indicative of the fact that the majority of east/west movements in this region, whether in the spring or autumn, take place with following winds (i.e. within ±90° of the track direction). This characteristic of the migrant movements across the southern North Sea has been discussed fully by Lack (1963a). The autumn results include 30% of opposing wind configurations (i.e. winds from 180° to ±90° with respect to track).

Fig. 10a reveals a rather surprising and unexpected lack of correlation between the wind direction and the median altitude. The spring results show no correlation at all, while the autumn figures suggest only a slight tendency for marginally lower altitudes to be assumed in the face of headwinds. Replot of the diagram, using as height parameter the percentage of heights in a given distribution that exceed 2,500 feet, yielded the same result.

The effect of wind speed has been investigated in fig. 10b where the median height is plotted against the resolved component of wind velocity along the flight path; no correlation has been detected in this scatter diagram.

On the basis of these results it must be concluded that migrating birds over the North Sea do not usually adjust their altitudes in response to the speed of the wind or its direction. This result is not necessarily at variance with the common observation that foraging birds overland tend to fly low into an opposing wind, a fact which is well illustrated by the Starling studies of Eastwood, Isted and Rider (1962). Similarly, birds flying out to sea in the face of an opposing sea breeze are commonly observed to travel close to the water surface. The migrant bird, airborne over the sea at an altitude of 2,500 feet and in the absence of short distance air turbulence, can have little cognisance of the wind state as a factor affecting its altitude. The reaction of the bird to the wind as a factor influencing its desired track may obviously be expected

to be much more positive than its effect on altitude—in the manner described by Drury and Nisbet (1964) for migration off the New England coast; it should be noted, however, that correction for drift has yet to be positively established for migrant birds over the southern North Sea, while drift correction in the apparently favourable case of Starling dispersals over land at low altitude and in daylight is often conspicuously absent (Eastwood, Isted and Rider 1962). It is suggested, therefore, that it is hardly reasonable to expect altitude adjustment by migrant birds in response to the variations in wind speed and direction encountered during an extended flight, nor would it be effective in improving ground speed unless the altitude were reduced to a dangerously low level; this would be particularly the case over the sea at night.

In view of the widespread assumption that migrating birds fly higher with following winds than with head winds, it would obviously be desirable to perform a still more detailed analysis of the altitude/wind effect. Such an investigation will demand the accumulation of a considerable volume of data on individual angels by day and by night over the sea, with wind parameters accurately determined at the time of observation and not inferred retrospectively from synoptic weather charts. It is interesting to note, however, that Bellrose and Graber (1963) also found the altitudinal distribution of their overland migrants as measured by radar to be similar regardless of whether winds were opposed or following.

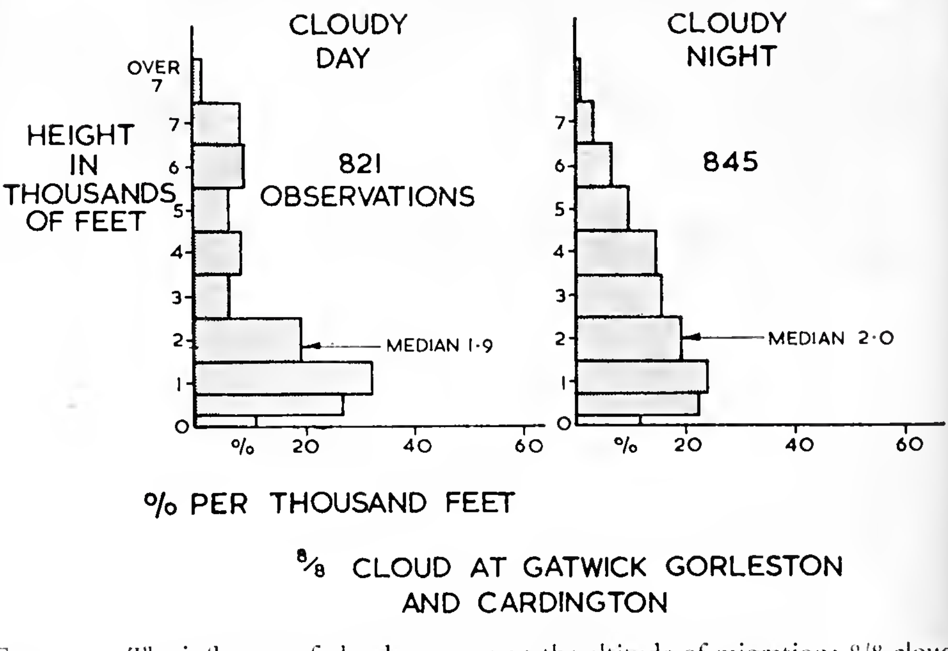


FIG. 11. The influence of cloud cover upon the altitude of migration: 8/8 cloud reported at Gatwick, Gorleston and Cardington

INFLUENCE OF CLOUD COVER UPON THE ALTITUDE DISTRIBUTION

In order to test the effect of cloud cover upon the flight height of the birds, the measurements made on those days and nights when overcast prevailed over a large area were extracted from the year's observations. The criterion adopted for the presence of widespread overcast was the simultaneous registering of 8/8 cloud at Gatwick, Gorleston and Cardington. The resulting altitude patterns are shown in fig. 11. For comparison, fig. 12 shows the histograms derived from the measurements made on days and nights when the cloud cover records at the same three stations were 4/8 cloud or less. It was presumed that under these conditions all birds airborne would have a reasonable opportunity for clear viewing of the ground.

It is recognised that this group of histograms is a rather imprecise way of assessing the influence of cloud since the smoothing achieved by the inclusion of measurements spread over the year, over land and over sea, and on various azimuths without regard to the particular migration in progress, is obviously very large. Nevertheless, the diagrams clearly indicate a marked and surprising tendency for higher mean altitudes to be flown in the presence of complete cloud cover than under a clear sky. This tendency is brought out very well in table 3.

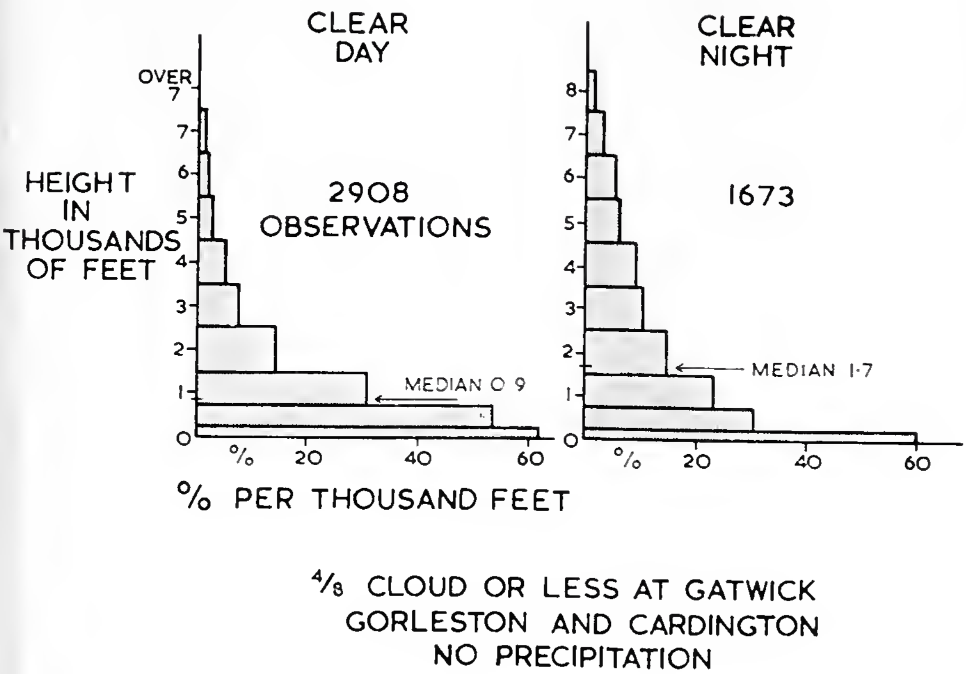


FIG. 12. The influence of cloud cover upon the altitude of migration: 4/8 cloud or less and no precipitation reported at Gatwick, Gorleston and Cardington (i.e. the birds could see the ground)

Table 3. Percentage of altitudes greater than 3,500 feet by day and night in clear and cloudy conditions

	Day	Night
Clear	13	25
Cloudy	33	35

The day and night effect already discussed is seen to be present in the case of the clear sky results, but it is interesting to note that the presence of cloud causes the daytime distribution to approximate more closely to that of the night.

When the criterion for complete overcast was applied to the autumn measurements as a whole, the histogram of fig. 13 resulted. These measurements were taken on westerly flowing migrants over the sea and show that 27% of all heights on cloudy days and nights were above 3,500 feet; the corresponding figure for clear days and nights was 18%.

It would appear reasonable to interpret these results in terms of the birds seeking to overfly the overcast and so cruising at higher mean altitudes. It should be particularly noted that the lower flight levels are not wholly abandoned, nor is there zero population above the cloud base; the birds are, in fact, more uniformly distributed in altitude. By means of the tracker and with the aid of the discrimination provided by the M.T.I. facility, birds have been observed and measured within the cloud layer itself. The histogram for 23rd October 1962 (daytime), shown in fig. 14, is particularly interesting in that the distribution, although continuous through the levels reported for the cloud base at Gatwick and Gorleston respectively, is yet seen to show a marked

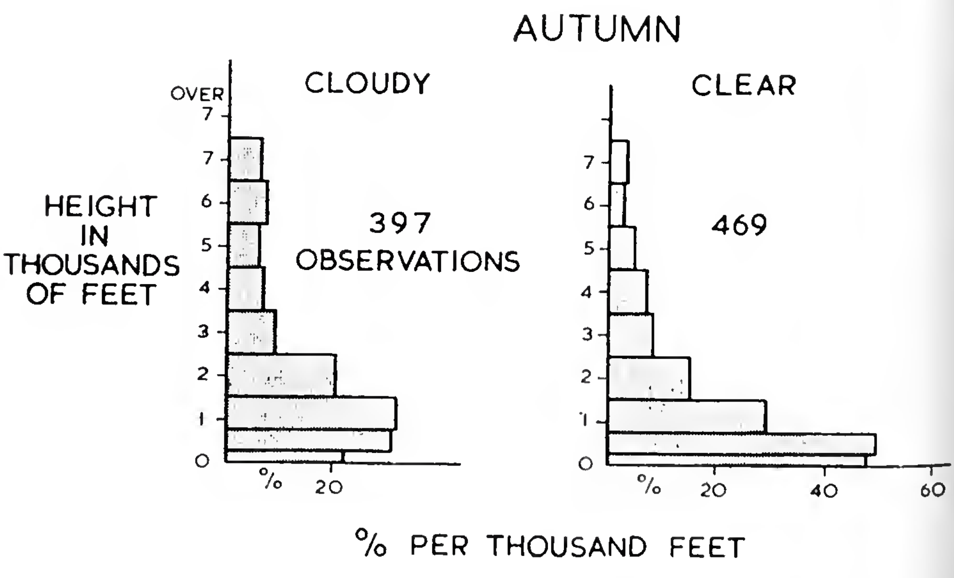


FIG. 13. The influence of cloud on height of autumn westerly migration

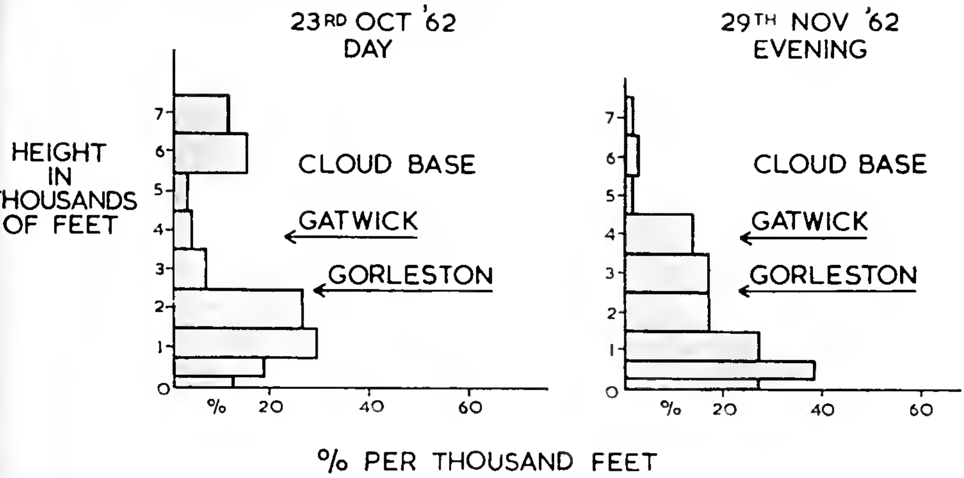


FIG. 14. Height distributions showing cloud base levels: (a) mid-day on 23rd October 1962; and (b) evening on 29th November 1962

change at this level and so suggests a threshold effect with a reduced density of distribution above the cloud base. The corresponding histogram for the night of 29th November 1962, also given in fig. 14, is likewise seen to be continuous through the cloud base level but indicates a significant percentage of birds above this level. Unfortunately no information was available from the meteorological office on the height of the upper limit of the cloud layer on this occasion, but it was likely to have exceeded 7,000 feet. The conclusion seems to be inevitable that approximately 35% of the birds were flying within the cloud layer itself. This rather surprising result agrees with the observations of Bellrose and Graber (1963) who observed migrating birds enveloped in cloud on more than one occasion.

'CEILING' EFFECT ATTRIBUTABLE TO TEMPERATURE

The observations presented in the above paragraphs have shown that migrating birds in the south-eastern region of England are to be found at a wide range of altitudes, the pattern of the altitude distribution being influenced by time of day, season of the year, the presence of wind or cloud, and so on. While the broad features of the altitude distribution pattern over the height range 0-8,000 feet, as shown in fig. 7, are usually present, it would be wrong to assume that marked departures from this general pattern do not occur. Wide variations in altitude behaviour certainly do take place and one such spectacular incident occurred on 12th March 1959; this event possessed a number of features which are of sufficient interest and significance to merit presentation in detail.

The appearance of the p.p.i. on the Bushy Hill Surveillance Radar at 11.15 hours on 12th March 1959 is shown in fig. 15. Radar obser-

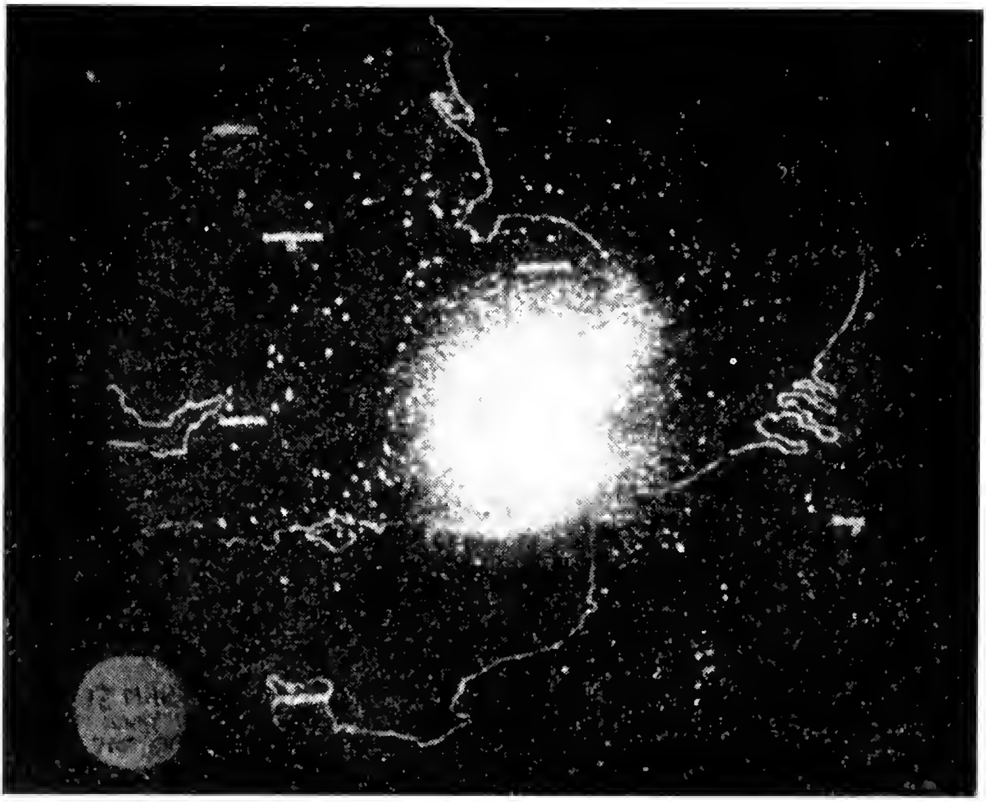


FIG. 15. Plan position indicator (p.p.i.) display, Bushy Hill radar, at 11.15 hours on 12th March 1959

vations on that morning began at 07.00 hours and showed that a heavy eastward migration was in progress, the intensity of which gradually reduced until 14.00 hours. The weather was fine and clear and a westerly wind of 5 knots produced ideal conditions for the heavy easterly movement which took place in accordance with the characteristic pattern of March migratory movements for East Anglia. Lack has shown that such March movements are composed of the passerine winter visitors to this country returning to their more northerly Continental breeding grounds; the species involved include Starlings, thrushes *Turdus spp.* and Chaffinches.

Vertical sections of the angel formation of fig. 15, taken at bearings of 0° and 135° by the height finding radar shown on plate 60, are illustrated on plates 62a and 62b respectively. The remarkable constancy in altitude of the birds will be noted. This feature of the photographs is in sharp contrast to the diffuse distribution in altitude which is normally observed. On these photographs the height cursor has been set to read 3,000 feet; the aircraft response at 44 miles on plate 62a may be compared with the feebler angel echoes. Similar altitude sections were taken at azimuth intervals of 45° and the height/range measurements are summarised in fig. 16. Although this intense angel

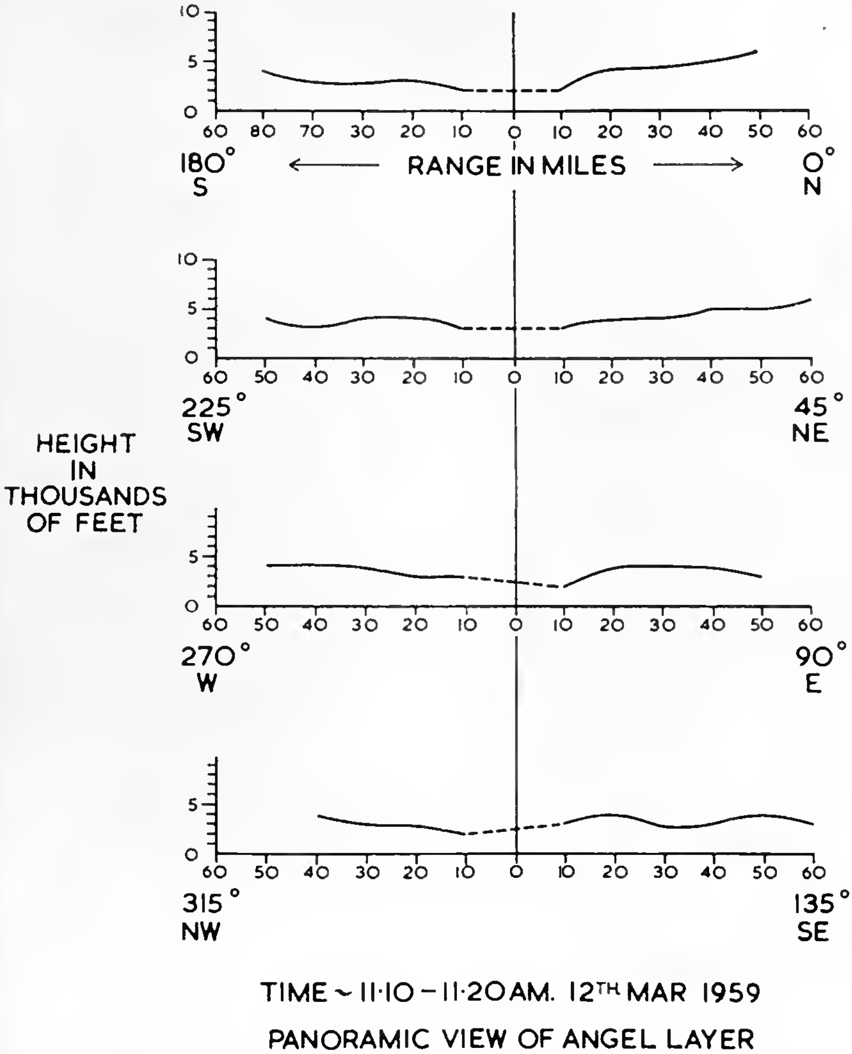


FIG. 16. Panoramic view of angel layer from 11.10 to 11.20 hours on 12th March 1959

formation covered an area greater than 7,000 square miles, the birds were clearly concentrated in a comparatively thin layer whose altitude was approximately 4,000 feet. The meteorological station at Hemsby gave the noon height of the freezing level as 4,500 feet.

It appears difficult to avoid the conclusion that the migrating birds were climbing to a height just below the freezing level, but were deterred from penetrating this layer, whether by the presence of ice crystals or simply because of the low temperature is not clear. Nevertheless, the presence of the freezing layer appeared to impose a 'ceiling' upon the birds and did so much more effectively than the presence of a cloud layer. It is suggested that temperature is a factor of some importance in determining the form of the altitude distribution function. This possibility is all the more interesting in view of Lack's conclusion

(1963b) that temperature at ground level plays a very secondary rôle in the initiation or suppression of migration during the autumn, but is significant during the spring. It is perhaps relevant to observe that, since a bird's only cooling mechanism is loss of moisture through the mouth, this water resulting from the oxidation of the body fat in order to provide the energy which is the motive power of flight, it is not too fanciful to think that the altitude assumed is such that there is equilibrium between water produced and lost, and so is dependent upon the relative humidity of the ambient air.

EVIDENCE FOR A LAND/SEA EFFECT

One very interesting feature of the major westerly immigration movement, which reaches its peak in November, is that the flow of angels over the North Sea does not cease abruptly at the coast of East Anglia, but continues overland (i.e. the majority of the birds do not alight on reaching the coast but maintain their flight towards their ultimate winter quarters). This continuity of flow is rendered very apparent when the p.p.i. films are viewed on a cinematograph, due to the time compression effect. One frame of Bushy Hill radar is recorded in 15 seconds but the projection speed for viewing is 24 frames per second, i.e. the time comparison ratio is 360, and the passage of angels over the coast is then clearly visible.

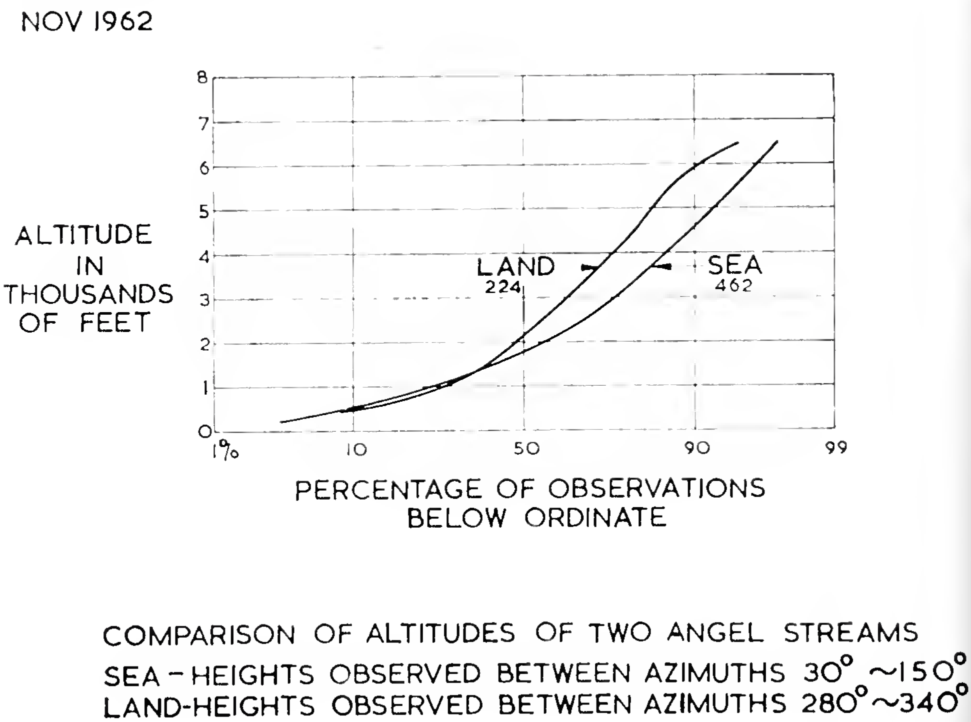


FIG. 17. Land/sea effect. Cumulative distributions are shown, for November 1962, for the height of westerly movements in the sectors 30° to 150° (i.e. over sea) and 280° to 340° (i.e. over land) (see fig. 4)

It would be expected that the flight behaviour of the birds would change after crossing the coast and that the altitude distribution pattern would be modified accordingly. In order to test for such an altitude land/sea effect, the height measurements made during November 1962 were analysed for fig. 17. The heights included in the analysis were those corresponding to westerly flights only, taken with a following wind; the land and sea curves are based upon measurements made in the sectors 280°-320° and 30°-150° respectively as indicated in fig. 4. The land in the sector 280°-320° averages 300 feet above sea level.

The land and sea cumulative distribution curves of fig. 17 are sensibly identical up to the 1,200-foot level, but diverge thereafter with the 'land' curve climbing above the 'sea' curve. The median altitude of the 'overland' distribution is 2,200 feet and is significantly greater than the median altitude of 1,700 feet derived from the 'oversea' distribution. It is considered that this land/sea altitude difference is a real effect which is not wholly to be explained in terms of the time difference between the land and sea observations (i.e. fig. 4 shows that a distance of approximately 90 miles separates the two regions of measurement, which corresponds to an average time difference of about 3-4 hours, assuming a ground speed of the birds in the order of 30 knots). Such a time difference, in conjunction with the November diurnal curve of fig. 6, could explain part of the difference if the oversea measurements were taken in the afternoon and the land readings in the evening. In fact, the measurements were randomly taken and so this time delay factor would almost certainly cancel out. Nevertheless, it would be desirable to repeat this land/sea investigation by securing the two sets of height measurements simultaneously.

If this land/sea altitude effect in the course of the same migratory movement is indeed real, it becomes of great interest to discover the cause. If the bird measures its altitude by visual observation it would be expected that the physical features of the ground would permit more accurate height estimation overland than oversea, particularly at night, and so a lower altitude over the land would seem more probable, but this is contradicted by the measurements. It would appear more likely that some servo-effect is in operation, dependent upon pressure, temperature, humidity, or a combination of all three. Further detailed measurements to investigate this possibility will be made.

The ear of a bird is undoubtedly capable of functioning as an aneroid barometer type of altimeter—just as the human ear is sensitive to sudden pressure changes accompanying descent in an aircraft, passage of a locomotive into a tunnel or even rapid descent of a hill in a car. The bird's altimeter would be capable of responding to changes in altitude, but it is more difficult to understand how the bird could measure absolute altitude with the unaided ear. Such a measurement would require that the bird should 'remember' the sea level pressure,

just as the pilot finds his altitude in the neighbourhood of his destination by setting the zero of his altimeter to local ground pressure. The migrant bird's en route flight behaviour has all the appearance of being servo-controlled in altitude, but the nature of the loop still remains obscure.

EFFECT OF ALTITUDE DISTRIBUTION UPON THE APPARENT DENSITY OF MIGRATION

The density of angel echoes upon a p.p.i. is a rough measure of the number of birds airborne within a given area. A vivid example of this effect is provided by the dispersal of Starlings from their roosts at sunrise when the successive waves of closely grouped birds give rise to intense echoes in the form of expanding rings upon the p.p.i. (Eastwood, Isted and Rider 1962). When a major migration movement is viewed by a suitably located radar, the bright echo region on the p.p.i. may extend to ranges in excess of one hundred miles. On a day unsuited to migration, on the other hand, only a few scattered angels may be visible upon the tube, and so it has appeared not unreasonable to use the extent and density of angels in the echo region as measures of the scale of migration. Thus Tedd and Lack (1958) defined a rough, numerical scale of angel densities which was later applied by Lack (1959) to describe the relative magnitudes of migration movements in the vicinity of Norfolk. It was clearly recognised by Lack (1962) that a limitation of the radar technique was the invisibility of birds flying below the beam of his radar, which meant that the apparent or radar density of a migration might be an underestimate if a greater proportion of the birds than usual were flying at low altitudes. Lack (1962) stated, 'With the information and techniques at present available, it does not seem possible to make any proper allowance for the influence of height of flights on apparent density, so the reader must keep in mind that what is here recorded is the volume of migration above the radar horizon, and not the whole volume.'

Conversely, it was also recognised that a tendency to fly higher might result in higher migration densities being assessed. Lack (1962) suggested that such variations in density assessments might be greater by day than by night since the birds are then flying lower. A further important example of the possible influence of altitude upon apparent migration density arises from the same author's observation that autumn movements were commoner and denser with following winds than with head winds (Lack 1963a). It was suggested by Nisbet (Lack 1963b) that part of the correlation found by Lack between the apparent density of autumn migration and following winds might be attributable to the birds flying higher in accordance with Nisbet's Cape Cod observation that migrants fly higher with a tail than a head wind (Nisbet 1963a). The measurements of the present paper, however, have not

suggested any substantial correlation between the heights of migrants over the North Sea and the wind direction, and so the above altitude interpretation of Lack's autumn density observation is not wholly convincing.

Since the present investigation has established the general form of the altitude distribution pattern of North Sea migrants and has shown that the bulk of the movements take place in the height band 0-8,000 feet, it is of interest to examine briefly the nature of the interaction between the altitude distribution function and the cover diagram of the surveillance radar, and so to determine whether migration density as estimated from the p.p.i. of the radar is particularly sensitive to the altitude of the movement.

It will be seen from fig. 2 that the reflecting surface of the Bushy Hill aerial is in the form of a cylinder whose section is a distorted parabola. The interaction of this reflecting surface with the electromagnetic waves emitted from the waveguide feed produces a pattern of radiation in the vertical plane which is not uniform but is concentrated at the lower angles of elevation. The same aerial also collects the radio energy scattered from an aircraft or bird and the sensitivity of the aerial

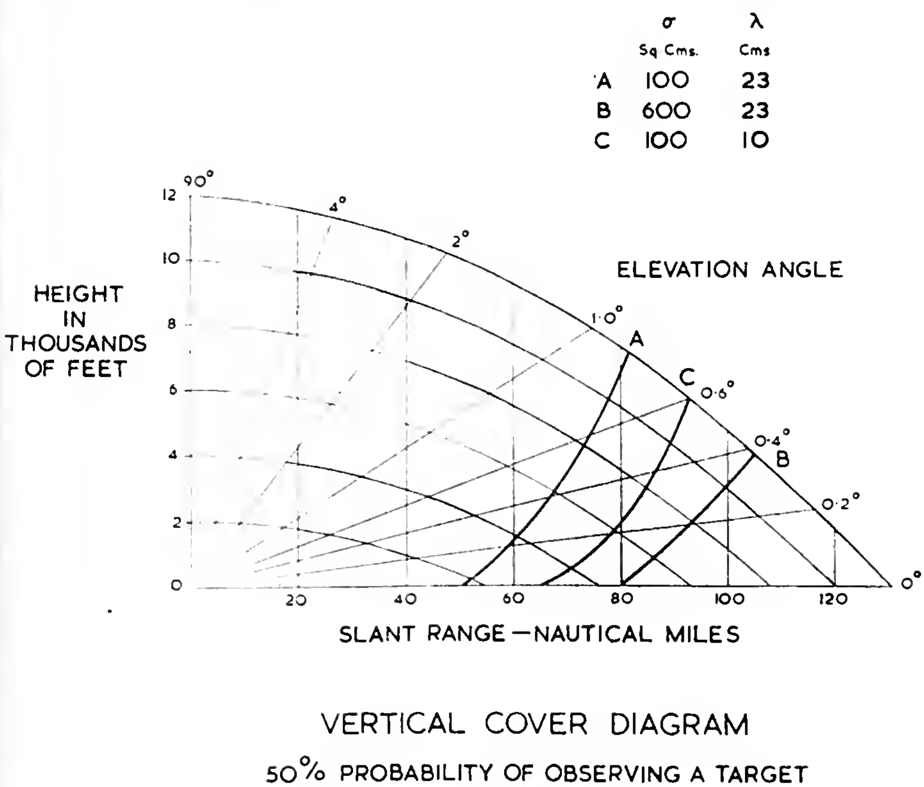


FIG. 18. Vertical cover diagram relating range and height for 50% probability of observing the specified reference target (σ). Curve A: Bushy Hill surveillance, wavelength 23 centimetres, σ 100 square centimetres. Curve B: Bushy Hill surveillance, wavelength 23 centimetres, σ 600 square centimetres. Curve C: Radar used by Lack, wavelength 10 centimetres, σ 100 square centimetres

viewed as a receiver is similarly concentrated at the same low angles of elevation. The aerial at Bushy Hill was designed in this way in order to provide continuous cover on aircraft from 0° elevation up to angles near the vertical. Indeed, since the site height is 250 feet, Bushy can 'see' at small angles of depression.

It is convenient to present the transmitting and receiving characteristics of a radar aerial combined in one diagram, as in fig. 18, called a Vertical Cover Diagram or, sometimes, Vertical Polar Diagram. Curve A marks the limit of visibility of a standard target in the form of a metal sphere, the area of whose diametral plane is 100 square centimetres; such an object is said to possess an Echoing Area or Target Cross Section of 100 square centimetres. The shape of this diagram is readily calculable from the geometry of the aerial and the wavelength of the radiation employed, but the scale of the diagram (i.e. the actual magnitudes of the ranges and altitudes covered) depends upon the other parameters of the radar system (transmitter power, receiver sensitivity, characteristics of the p.p.i. display, and so on) and also upon the nature of the scattering target. A metal sphere scatters the energy incident upon it uniformly, i.e. its target cross section or echoing area 'σ' is constant and independent of the angle of incidence of the radiation but is determined by the absolute size of the sphere. If a larger standard sphere of 600 square centimetres were used as target, then curve A of fig. 18 would be displaced to curve B, the limiting range at a given angle of elevation being proportional to $(\sigma)^{\frac{1}{4}}$.

It should be noted that such a performance diagram has to be interpreted statistically. As explained above, if the parameters of a radar system are known, then the cover diagram that would be achieved for a standard spherical target is calculable and experiments on such targets have amply verified the theoretical predictions. It is true that propagation anomalies due to atmospheric temperature gradient effects sometimes confuse the results, but such events are relatively rare in Britain and are easily recognisable. The main departure from simple radar theory lies in the fact that neither an aircraft nor a bird scatters radio energy isotropically in the manner of a metal sphere. The amount of energy returned to the radar aerial is, in fact, markedly dependent upon the aspect presented to the incident radio waves. Edwards and Houghton (1959) have measured the echoing areas of several birds in various aspects and have shown that the echoing areas change very rapidly with the angle of incidence, with the result that the echo from a bird can show marked fluctuations. Thus a Starling viewed from ahead possesses a target cross section in the order of 2 square centimetres; and a broadside value of 10 square centimetres. A single angel echo on the p.p.i., however, is normally produced by the summation of reflections from the individual members of the group of birds that form a flock. The signal from each bird varies with the

PLATE 60. High-power radar height-finder with a wave-length of ten centimetres. A beam 1° wide nods up and down in the vertical plane; the width of the horizontal beam is 4° (page 397) (*photo: Photographic Section, Marconi Research Laboratory*)

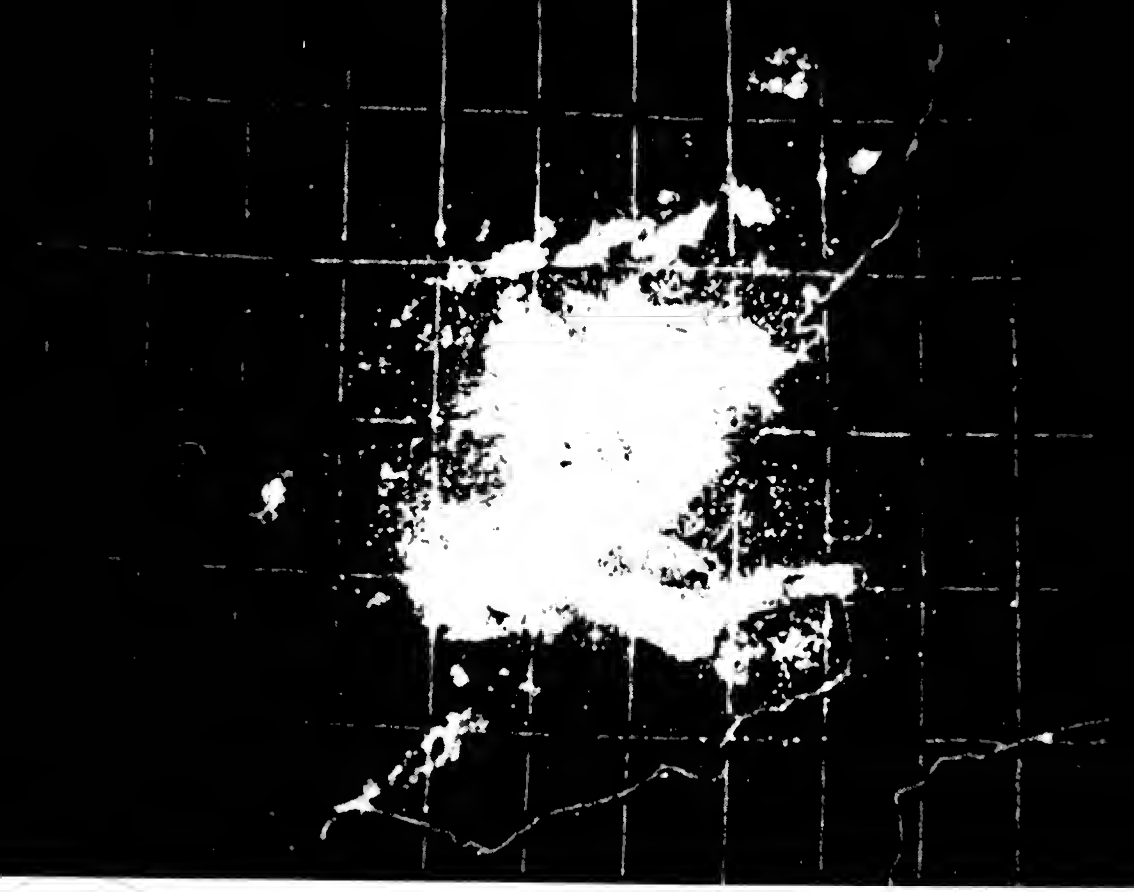
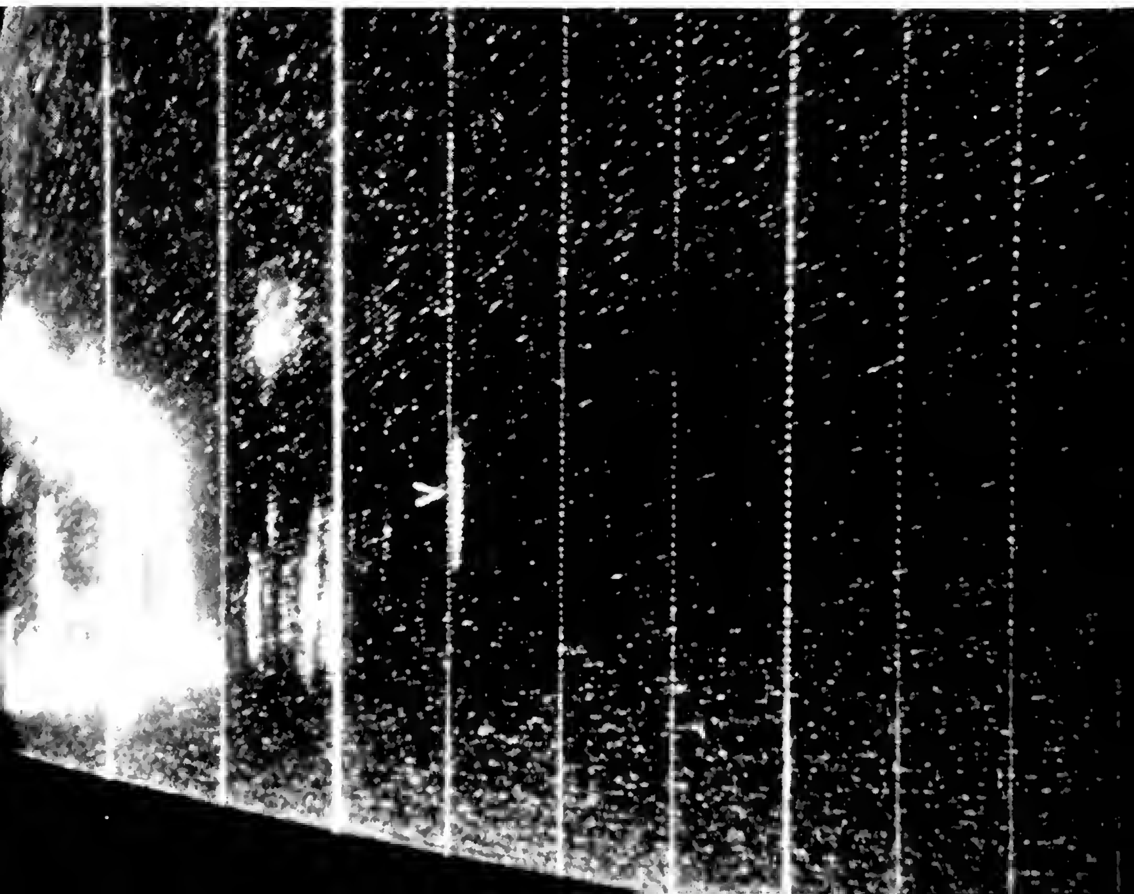


PLATE 61. Above, plan position display and, below, associated range height display for 2[illegible] hours on 22nd August 1958. The target, ringed above and arrowed below, is at a range of 51 nautical miles and a height of 10,000 feet (page 398)
(*photos: Photographic Section, Marconi Research Laboratory*)



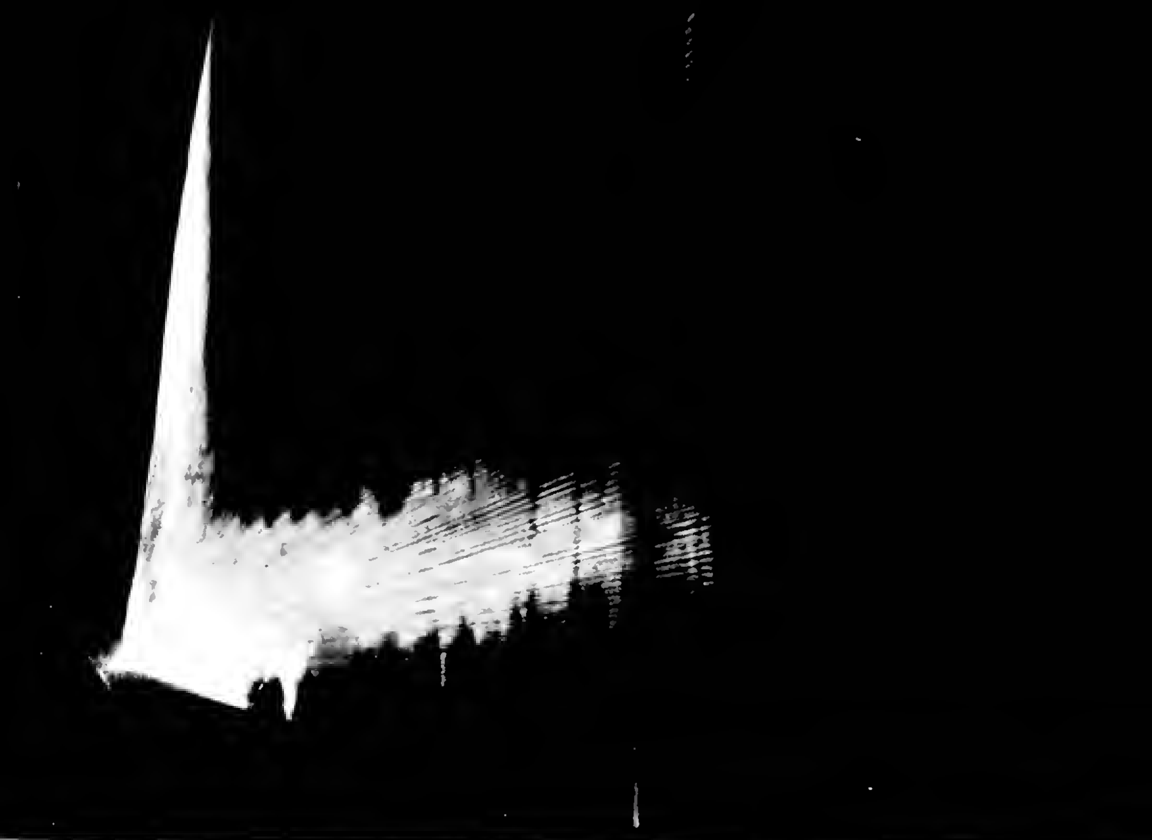
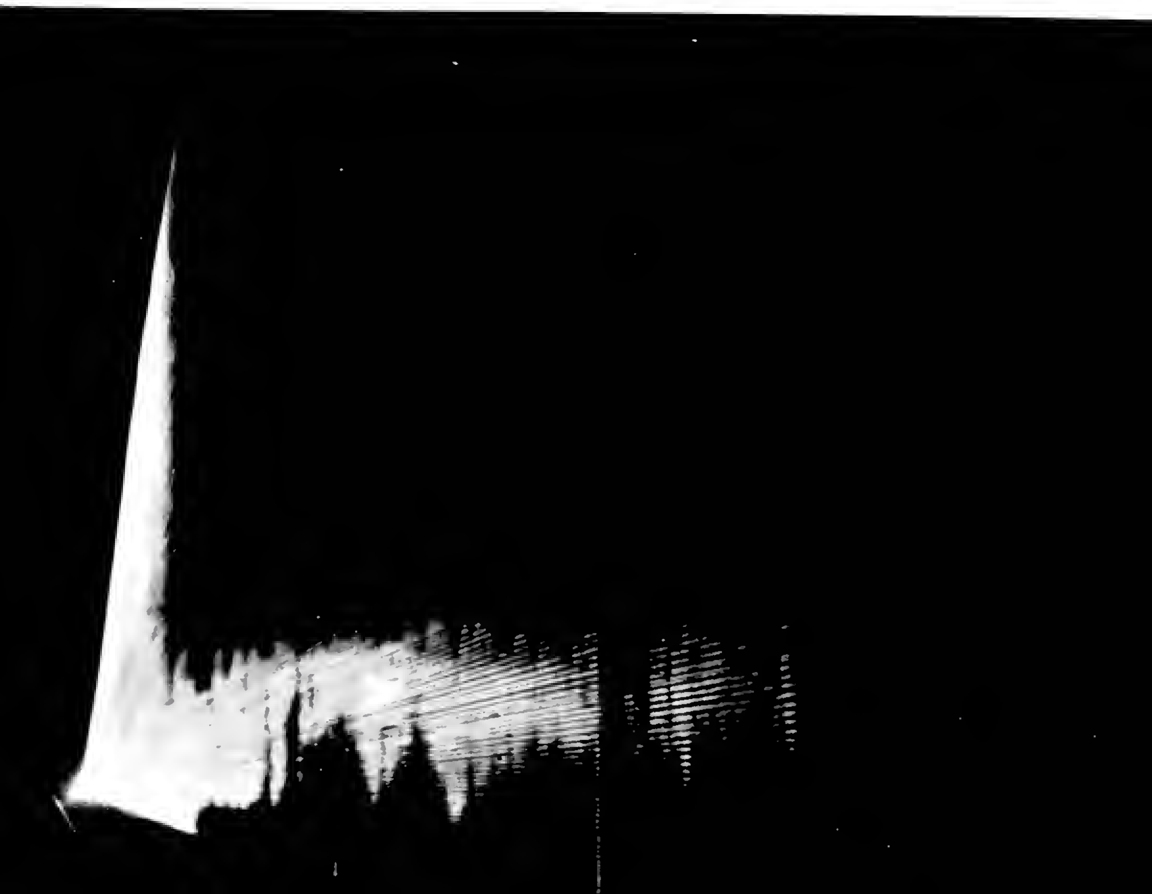


PLATE 62. Range height display at 11.1[illegible] hours and 11.2[illegible] hours on 12th March 1959: above, azimuth 0° and, below, azimuth 135°. The height cursor indicates 3,000 feet (page 414) (*photos: Photographic Section, Marconi Research Laboratory*)



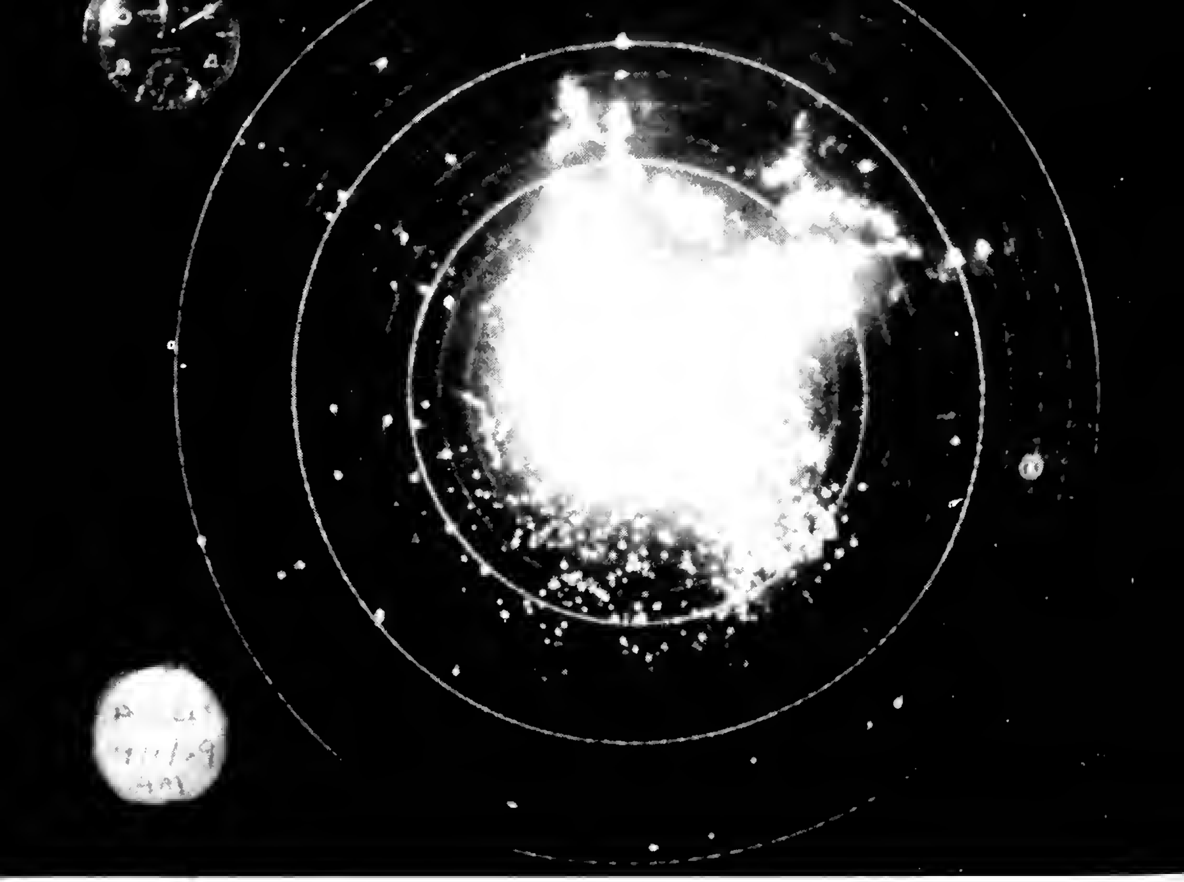
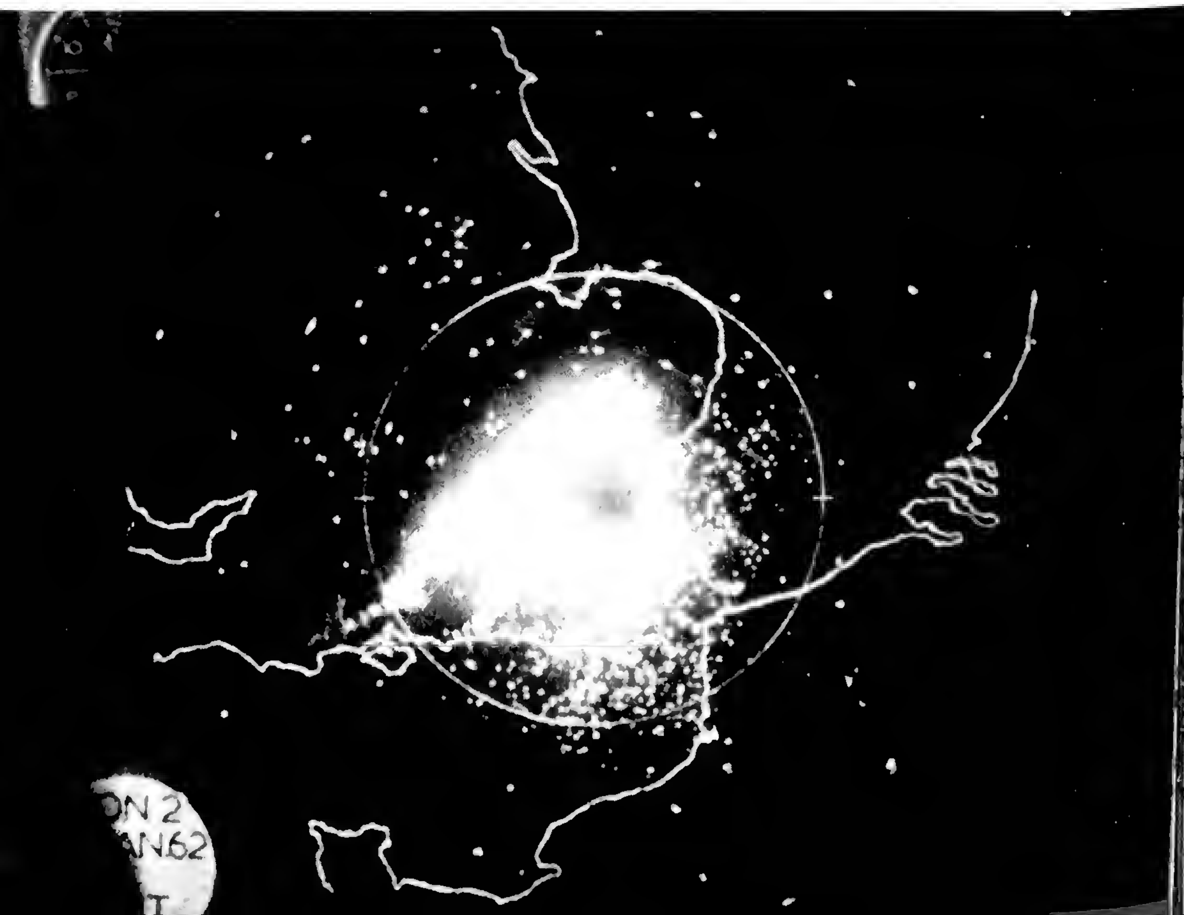


PLATE 63. Temporary winter movements of Lapwings (*Vanellus vanellus*) as seen on radar. Above, southward movement before cold frontal weather on 9th January 1959. Below, northward movement following warm frontal weather on 6th January 1952 (page 423) (*photos: Photographic Section, Marconi Research Laboratory*)



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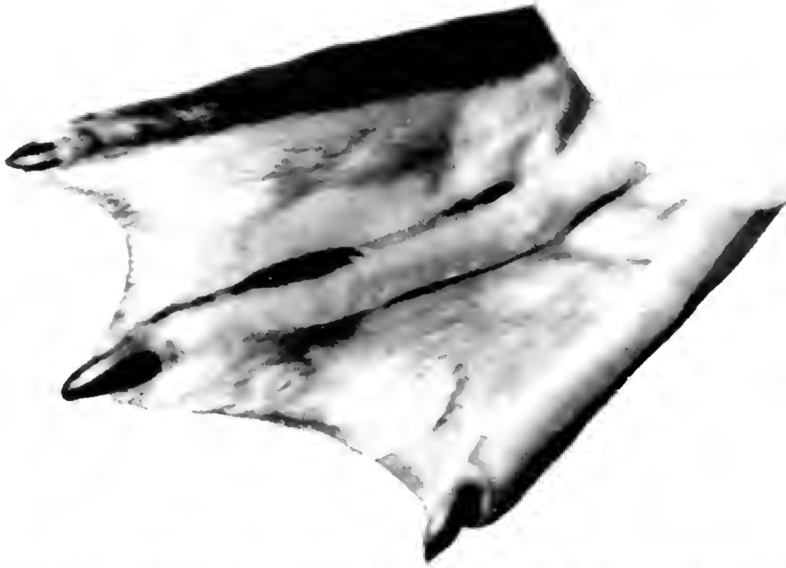

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PLATE 65A. Cross-section of web on foot of Manx Shearwater *Procellaria puffinus* with puffinosis, magnification × 50. The surface layer of keratin on the right is split from the epidermis by a large blister and the end of another blister can be seen above it

PLATE 65B. A later stage where a blister has burst on the lower surface and the layer of keratin is completely missing; the epithelium is severely damaged and colonies of bacteria can be seen as dark patches along this lower edge

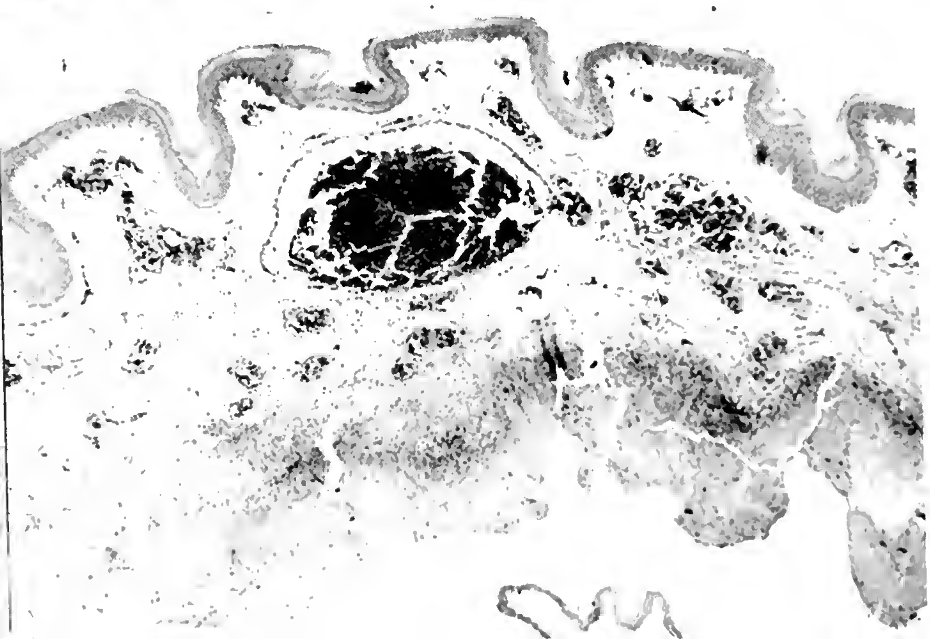

PLATE 65C. Here the epithelium on the lower surface has become replaced by a mass of necrotic material. At the same time the capillaries are greatly dilated and show as darker patches in the middle of the section (pages 433-434) (*photos: G. Holland*)

PLATE 66. Female Red-breasted Flycatcher *Muscicapa parva*, Czechoslovakia, June 1964. The male alone has the orange-red throat, but both sexes are easily recognised by the white patches on either side of the base of the tail, which is frequently cocked when the bird is perched (pages 434-438) (*photo: Ilse Makatsch*)

PLATE 67. Male (left) and female Red-breasted Flycatchers *Muscicapa parva* at nest, Czechoslovakia, June 1964. Note the white patches at the sides of the male's tail. The nests of roots, stalks, moss and hair are usually in holes, occasionally in forks, in cracks or among shoots (page 436) (*photos: Ilse Makatsch*)

aspect, but if the separations of the birds are random then the fluctuations are largely smoothed out and an effective resultant signal is yielded, which corresponds to the sum of the powers scattered by the individual birds composing the flock. This smoothing effect increases with the number of birds and is quite marked in the case of flocks of Lapwings which yield strong, steady echoes. The echoing area of a bird flock is therefore dependent upon the radar wavelength, the species (i.e. size of bird), the aspect of each bird, the number of birds in the flock, and the relative positions and movements of the individual birds. These contributory effects to the scattering behaviour of the flock as a whole can never be known precisely and so the target cross section of a given flock fluctuates randomly in time and can only be defined in statistical terms. The result is that for an angel with average cross section σ there is only a probability that it will be seen by the radar during a single scan of the aerial and this probability varies with range and altitude. In the cover diagram of fig. 18 partial expression of these ideas has been embodied in that the curves are given for a 50% probability of detection, i.e. curve A expresses the range/altitude relation for a target of time average cross section 100 cm^2 which will give a recognisable radar echo for half the transits of the radar beam across it. This variation of the signal from a target due to the fluctuation of the echoing area is termed 'radar fading' and is a subject which receives much attention in radar research.

It is seen by reference to the 100 cm.^{2} target curve A of fig. 18 that the limiting range for an altitude of 3,000 feet is 56 miles. Change of the altitude to 4,000 feet extends this range to 60 miles (i.e. a 33% increase in altitude extends the range by only four miles). Again, in the case of the 600 cm.^{2} target curve B a change of altitude from 6,000 feet to 8,000 feet (i.e. 33%) extends the limiting range from 86 to 94 miles (i.e. 10%). The parameters of the 10-centimetre radar employed by Lack yield the 100 cm.^{2} target curve C. It is seen from this curve that altitudes of 4,000 feet and 6,000 feet correspond to limiting ranges of 70 miles and 78 miles respectively (i.e. at this point of the curve 50% change in altitude produces only 11% change in range).

Now the distribution histograms given in this paper, and particularly fig. 5, show that the median altitude for migrants crossing the North Sea is in the order of 2,000 feet, for which the limiting range on a 10-centimetre equipment of Bushy Hill type would be 54 miles (horizon limited); doubling of the altitude to 4,000 feet would extend the range to 70 miles. It is true that this curve would almost certainly not apply to the echoing areas of the flocks actually observed by Lack (1963a), but the proportionate range increase with respect to altitude would not change by scaling of the curve to correspond to the precise echoing areas, while the increased gradient of the cover curve at higher altitudes would mean that the percentage change in the limiting range

with altitude increase would be correspondingly reduced. The fact that the median altitude for the North Sea is in the order of 2,000 feet, with the majority of the birds below 5,000 feet, suggests, however, that the limiting or extinction range to which an extended migratory movement is visible is set by the radio horizon (i.e. the 0° elevation line). The simple geometry of this situation then shows that the fractional change in extinction range is half the fractional change in altitude producing it (i.e. 20% change in altitude at the radio horizon would yield 10% change in extinction range). It must be concluded that these figures hardly support Nisbet's suggestion that a 20% change in the average height of a migrating movement would mean a reduction in density of one unit on Lack's logarithmic scale of densities.

Consideration of the altitude distribution pattern in association with the radar cover diagram shows that height certainly has an influence upon the apparent extent of a migration, but the relation is not a sensitive one in the case of the Bushy Hill type of radar used in the present work on 23 centimetres, nor in the 10-centimetre version of it used by Lack. The probability is that Lack's observations are not to be interpreted as resulting from an altitude change, but are simply denser movements. It is true that Lack (1963a) reported marked changes in altitude on some south-south-west movements during the month of November (e.g. 5,000/7,000 feet to 7,000/8,000 feet in half an hour, with corresponding changes in the limiting range from 50 to 65 miles). Consideration of his radar cover diagram, however, suggests that the target characteristics of the angels composing the two movements were not identical and so the measured altitude difference does not wholly explain his observation. The systematic height measurements reported in the present work also show that such high altitude events are comparatively rare, for fig. 7 indicates that 98% of November altitudes are below 7,000 feet.

The counting of birds in major migratory movements is an uncertain process, as has been explained by Nisbet (1963b). Useful results will only be obtained provided that the following conditions are fulfilled:

(a) Accurate knowledge of the cover diagram of the surveillance radar, combined with stable equipment. Ground interference effects have not been included in the present discussion, but it should be noted that fluctuations from this cause can arise at very low angles of elevation.

(b) Measurement of the altitude distribution simultaneously with limiting range measurements and target counts on the p.p.i.

(c) Measurement of the echoing areas and their time variation by means of a tracking radar.

We shall return to a critical discussion of radar bird counting in a later paper, but we would like to conclude the present paper with a brief account of two time separated but related hard weather move-

ments which illustrate how the cover diagram of the surveillance radar can be used to suggest the altitude at which a remote bird movement has taken place.

ALTITUDE ESTIMATION FROM THE VERTICAL COVER DIAGRAM

Plate 63 shows the initial and final phases respectively of two temporary winter movements which were recorded on two January days separated by an interval of three years. Plate 63a, for 9th January 1959, relates to a hard weather movement of Lapwings directed southward in the presence of a strong northerly wind bearing snow clouds. The discrete echoes are typical of Lapwings and it will be seen that the widespread movement apparently terminates at a range of 90 miles (range rings at 10 nautical mile intervals; the brighter rings correspond to ranges of 40, 80, 120 and 160 nautical miles respectively). When viewed by the accelerated cine film, the echoes are seen to be moving strongly southward but disappear at a limiting range of 90 nautical miles.

Plate 63b, for 6th January 1962, was taken at the end of a period of wintry weather which marked the beginning of that year. This picture records precisely the reverse movement to that which took place in January 1959: the Lapwings are here seen to be returning from the Continent to England and are accompanied by the northward passage of a warm front. The movement is again widespread and the beginning of visibility of the echoes occurs at the same range of 90 miles (the single range ring on plate 63b is at 80 nautical miles).

This pair of radar pictures contrasts the appearance of a cold front moving south with that of a warm front moving north. It will be noted that the Lapwings lead the cold front but follow the warm front. The fact that the limiting range is approximately 90 nautical miles in both cases suggests that the birds are confined to a comparatively thin altitude layer in this type of winter movement and the problem is to estimate the altitude at which such movements take place.

The vertical cover diagram of a radar shows the relation between the range and altitude of a standard target at the limit of visibility; if the extinction range of a target of known echoing area σ can be measured then the altitude at this point can be read off from the appropriate family of curves. Special interest attaches to the radio horizon at 0° elevation as mentioned above, for targets below this horizon are invisible to the radar. Curve A of fig. 18 intersects the 0° elevation line at a range of 51 miles and an altitude of approximately 1,600 feet. A bird flock of equivalent echoing area 100 cm.^{2} approaching the station at an altitude of 2,000 feet would remain invisible below the horizon until the range was reduced to 50 miles, when it would fly into the beam and become visible to the radar. Similarly, from curve B, a target of cross section 600 cm.^{2} at an altitude of 4,500 feet would be

invisible at all ranges greater than 80 miles. When a bird flock rises above the horizon at ranges well within the limiting range contour corresponding to its echoing area, then the echo will be immediately strong and does not pass through the flickering uncertain period typical of crossing the cover curve at high altitudes. This applies to the Lapwing echoes on plate 63.

Now the extinction range of the Lapwing movements on plate 63 is 90 miles. If the visibilities of these movements are assumed to be horizon limited then the altitude at extinction is seen to be $\sim$5,700 feet and the average echoing area of the flocks would have to be in the order of 1,000 cm.^{2} Assuming a value of σ for a single Lapwing of 20 cm.^{2}, then the average flock size would be approximately 50 birds, which is not an unreasonable figure. This method of altitude estimation is of course suggestive only, and its results cannot compare in accuracy with the measurements made on a radar height finder. Thus if a Lapwing flock were assumed to possess a cross section of 600 cm.^{2}, corresponding to 40 birds of 15 cm.^{2}, then curve B would apply and extinction at 90 miles would imply an altitude of 7,000 feet, which is markedly different from that yielded by the former assumptions. In the present instance the sharpness of the range cut off suggests horizon limitation and an altitude of 5,700 feet is regarded as the more likely.

A further example of altitude estimation by the vertical cover diagram is provided by fig. 15 already discussed. The limiting range of the angel formation at a bearing of 135° is 60 miles and appears to be horizon limited, which would suggest an altitude of 2,500 feet. Fig. 16 gives the height/range photo of this azimuth section and gives a true height of 3,000 feet at 60 miles. Similarly, on 23rd October 1964 a heavy southward migration took place over eastern England and continued for some hours in bright moonlight assisted by a 10-15 knot wind from the north. The p.p.i. pattern at 23.00 hours showed a symmetrical distribution of echoes around the station, which extended to a limiting range of 50 miles. Assuming the range to be horizon limited then the altitude of this widespread movement would be 2,000 feet—in substantial agreement with the other measurements of this paper.

ACKNOWLEDGEMENTS

It is a pleasure to acknowledge the valuable assistance unstintingly given to this work by N. R. Phelp, J. D. Bell and J. W. Hampton of the Great Baddow Laboratory, and also to W. F. Presland for drawing all the text-figures.

SUMMARY

(1) The altitude distribution of migrants over the southern North Sea was measured by radar over the period June 1962-April 1963. The results are presented in a series of monthly histograms; day and night distributions are shown separately.

(2) The median altitude derived from the night observations is 2,000 feet; the

corresponding result from the daytime measurements is 1,800 feet. In other words, migrants fly significantly higher by night than by day.

(3) The median altitudes for the spring migration (February, March and April) are 2,000 feet (night) and 1,700 feet (day). The westerly immigration of the autumn (October and November) shows median altitudes of 1,900 feet (night) and 1,600 feet (day).

(4) There is a tendency for higher mean altitudes to be flown in the presence of widespread overcast than under clear skies. The height distribution may be continuous through the cloud layer.

(5) A correlation has been looked for between wind direction and the median altitude. The spring results show no correlation, the autumn figures suggest only a slight tendency for marginally lower altitudes to be assumed in the face of head winds. No correlation has been found between wind speed and altitude.

(6) Analysis of the oversea and overland altitudes measured on the same migratory movement suggests identical heights up to 1,200 feet, but the altitude curves diverge thereafter, with the 'land' curve climbing above the 'sea' curve.

(7) The presence of a freezing level in the atmosphere may impose a ceiling upon the altitude distribution.

(8) The effect of altitude distribution upon the apparent density of migration as measured from the p.p.i. is discussed. It is shown that the apparent extent of a migration is affected by the altitude distribution, but the relationship is not a sensitive one. Some examples are given of the estimation of the heights of extended bird movements by the use of the radar cover diagram.

(9) Certain results in this paper appear to suggest the possibility that a migrant bird may 'select' its altitude and air speed as a result of a servo-type equilibrium between its metabolic processes and the temperature and humidity of the ambient air.

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Puffinosis among Manx Shearwaters on Skokholm

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(Plates 64-65)

INTRODUCTION

IN VARIOUS PAPERS, Dane, Miles and Stoker (1948-53) have described a virus disease, puffinosis, which causes epizootics (animal epidemics) among Manx Shearwaters *Procellaria* (=*Puffinus*) *puffinus* on Skomer Island, Pembrokeshire. In the past, isolated instances of the disease have been noted in the large shearwater colonies three miles away on Skokholm, but no epizootics were recorded there until 1962, 1963 and 1964.

The disease, which is only known to occur among fledglings, is characterised by blisters on both surfaces of the feet (plate 64a), conjunctivitis, spastic extensions of the legs and, in severe cases, paralysis of one side of the body which results in the individuals being unable to remain dorsal side uppermost. The symptoms vary with the epizootic. On Skomer in 1946, 1948 and 1949, and on Skokholm in 1962 and 1963, conjunctivitis was common, but there was little on Skokholm in 1964 and it was not seen at all on Skomer in 1947. Apart from

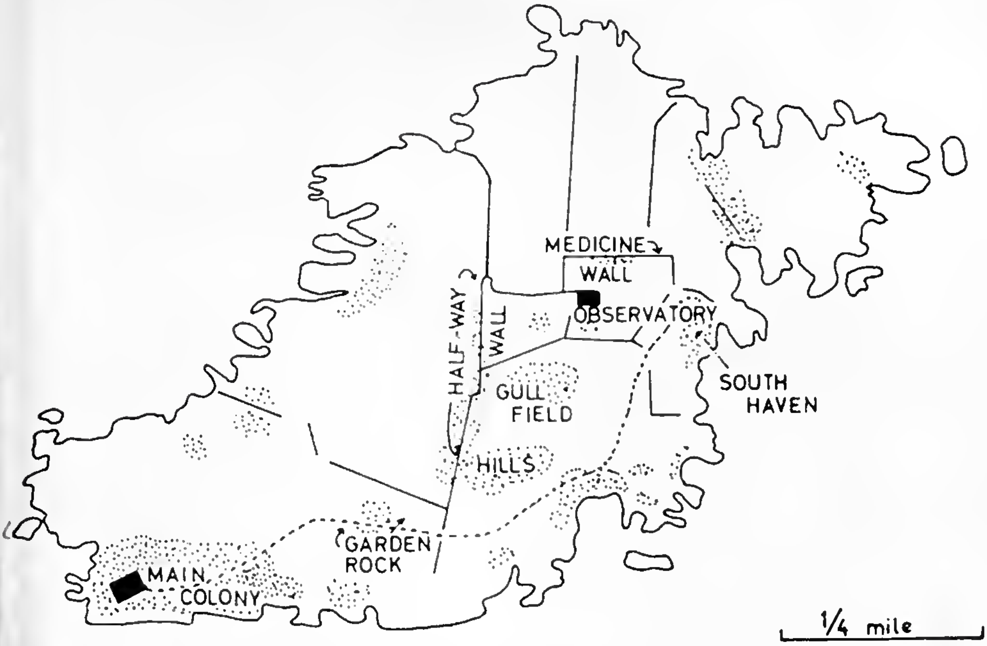

FIG. 1. Map of Skokholm, Pembrokeshire, to show the principal colonies of Manx Shearwaters *Procellaria puffinus*, the walls on the island and the names mentioned in the text. The dotted line indicates the main track

there being less paralysis, the 1964 epizootic on Skokholm was characterised by very large and extensive blisters on feet and tarsi. Paralysis does not normally affect the wings and birds which cannot stand (plate 64c) are often capable of flight if launched into the air.

This paper records the pattern of disease that was noted among Manx Shearwaters on Skokholm in the epizootics of 1962, 1963 and 1964.

GENERAL PATTERN OF THE DISEASE

(a) 1962

The disease was noted in the first week of September 1962 and quickly spread through colonies at Medicine Break, Gull Field, Half-way Wall and the Hills. The names of these and other colonies are shown in fig. 1, but only the larger ones are included there as shearwaters nest in almost all areas. Small colonies are found in all the walls and in all areas of bracken *Pteridium*. All the colonies named above, and also those in which the disease occurred in 1963 and 1964, are in dense areas of bracken and near to walls or rocky outcrops.

(b) 1963

The first diseased birds were found on 6th September 1963 near the Observatory and on Half-way Wall. The disease soon appeared on the Hills, Gull Field, Medicine Break and South Haven and was widespread until the end of the season.

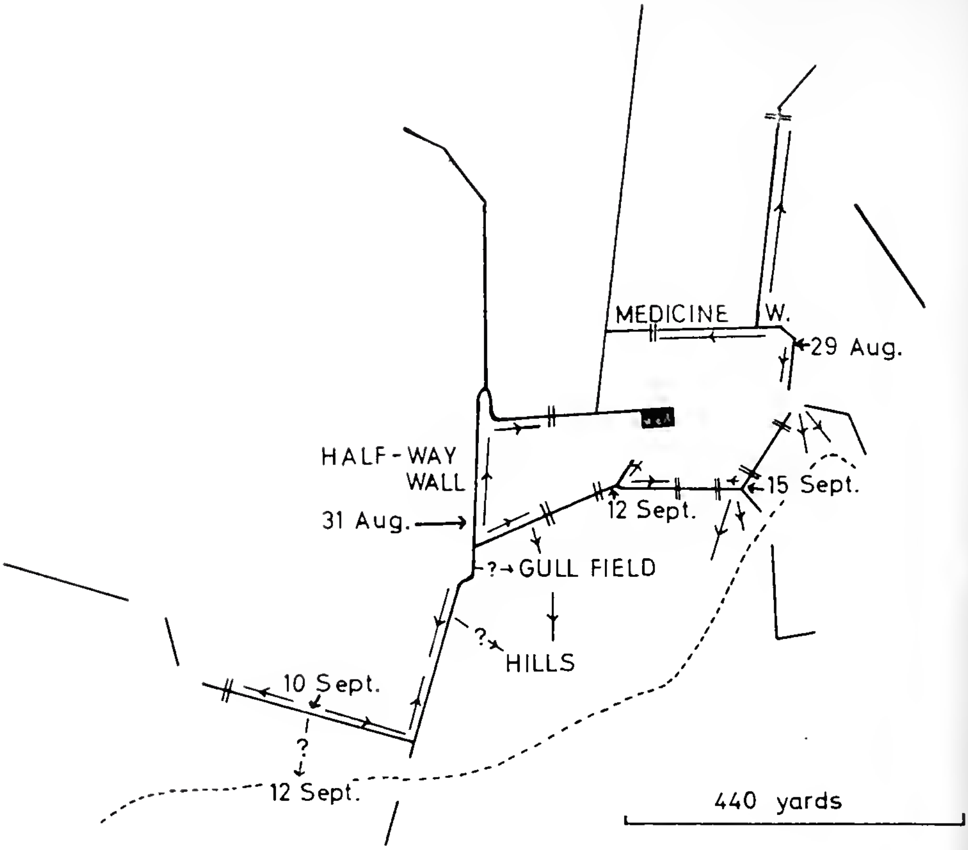

FIG. 2. Diagram of the walls on Skokholm, Pembrokeshire, to show the course of puffinosis among Manx Shearwaters *Procellaria puffinus* in 1964. Dates indicate when the disease was first recorded in each colony and arrows the probable routes of spread

Table 1. Numbers of Manx Shearwaters *Procellaria puffinus* found infected with puffinosis in the Half-way Wall colony on Skokholm, Pembrokeshire, in 1964

	Caught for first time			All including retraps			
	Number examined	Number infected	Percentage infected	Number examined	Number infected	Percentage infected	Number later dead
Before 31st August	161	0	0%	161	0	0%	14
1st-5th September	37	0	0%	38	1	2.6%	9
6th-10th September	139	24	17.3%	162	47	28.4%	23
11th-15th September	172	76	44.3%	304	168	55.2%	33
16th-20th September	27	6	22.2%	56	30	53.6%	1
21st-25th September	26	0	0%	39	10	25.6%	1
After 26th September	14	0	0%	30	0	0%	0

(c) 1964

On 29th August 1964 a young Manx Shearwater was caught at Medicine Break with severe blisters on feet and legs. Two nights later another diseased one was picked up at Half-way Wall. The disease spread rapidly amongst the shearwaters along the walls in these areas, but it was not until 10th September that it was noted elsewhere; it is possible that the later outbreaks were spontaneous and unconnected with the first one. The general details of the course of the disease in 1964 are shown in fig. 2. It was more widespread than in previous years, but included all the same areas. It was significant that it did not reach the extremely densely populated main colony.

The course of the disease was followed in the Half-way Wall colony by nightly visits, and details are summarised in table 1. It should be noted that the figures are bound to be biased by several factors: diseased individuals are slightly easier to catch than healthy ones; also puffinosis prevents the shearwaters from leaving for the sea, so that they are usually recaught, whereas non-infected ones are only infrequently seen after ringing. The peak of the outbreak was 9th to 16th September, after which the numbers infected decreased rapidly. The last one seen alive with blisters was recorded on 24th September.

WEIGHT LOSS OF AFFECTED SHEARWATERS

Seventy-nine freshly dead Manx Shearwaters with puffinosis were weighed (see fig. 3) and averaged 364 grams compared with 453 grams for 62 healthy individuals caught at other colonies from 17th to 27th September. It is known (Harris in press) that young Manx

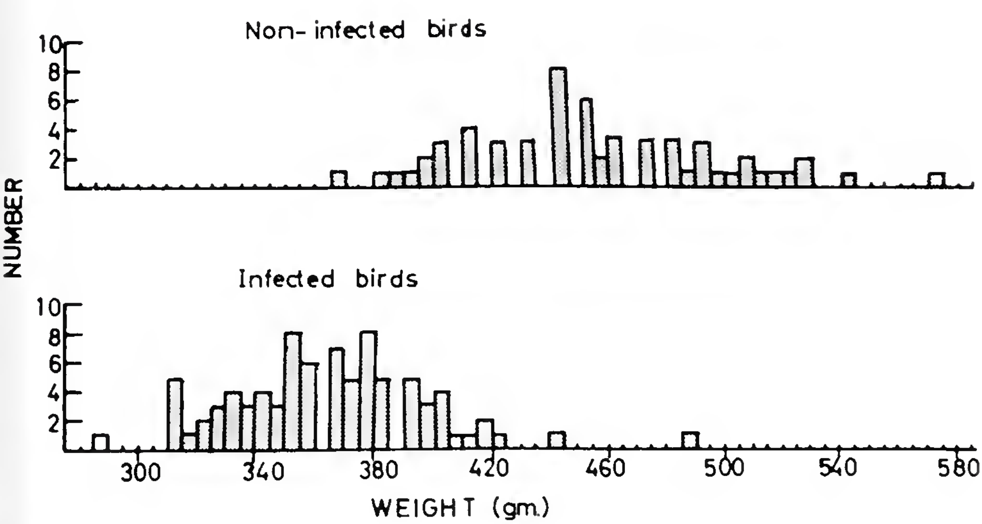

FIG. 3. Distribution of weights of Manx Shearwaters *Procellaria puffinus* on Skokholm, Pembrokeshire, in 1964: (*upper*) normal young just leaving their burrows and (*lower*) dead young infected with puffinosis

Table 2. Lengths of time between discovery and death of individual Manx Shearwaters *Procellaria puffinus* found infected with puffinosis on Skokholm, Pembrokeshire, in 1964

Length of time	Number dead	Length of time	Number dead	Length of time	Number dead
1 day	12	6 days	3	11 days	0
2 days	11	7 days	3	12 days	1
3 days	6	8 days	2	13 days	0
4 days	2	9 days	3	14 days	1
5 days	6	10 days	1	15 days	1

Shearwaters during this starvation period lose 15-20 grams a day. Young ones come out of the burrows (plate 64b) for several nights before actually leaving the colonies, in order to exercise their wings from such vantage points as rocks and walls. It seems probable that they become infected with puffinosis at this time (Dane 1948). If this is correct, it is likely that the average time between first leaving the burrows and death was 5-7 days; this is similar to previous estimates (Dane 1948; Dane, Miles and Stoker 1953). Death is not in most cases due to starvation, as the dead shearwaters often still have large fat reserves.

The observed times between marked individuals being found infected and dying are given in table 2. The average was four days, but this is minimal as it does not allow for the period between infection and when the bird was first caught.

The epizootic appeared to have died out before the last shearwaters left. However, although they showed no symptoms of the disease, these late ones were delayed in fledging and this is typical of infected birds. One weighing 440 grams on 28th September had decreased to 355 grams by 3rd October; another of 305 grams on 29th September had decreased to 255 grams by 3rd October. It seems possible that these late individuals had contracted a less virulent form of the virus.

MORBIDITY AND MORTALITY

The infection and mortality rates in 1963 and 1964 are given in table 3. These are minimal as some birds die, apparently of the disease, without showing any of the recognised symptoms; others must die in burrows or be carried away by predatory gulls *Larus spp.*, Carrion Crows *Corvus corone* and Ravens *C. corax*, all of which eat moribund shearwaters. Dane, Miles and Stoker (1953) suggested that the mortality rate of infected birds on Skomer was higher than 75%. My evidence throws no light on the true death rate, but it is certainly very high.

A few infected shearwaters succeeded in leaving Skokholm: one such ringed on 22nd September 1963 was recovered alive but weak

Table 3. Percentages of Manx Shearwaters *Procellaria puffinus* found infected with puffinosis on Skokholm, Pembrokeshire, in 1963 and 1964, and percentages later found dead

	1963			1964		
	Total sample	Percentage infected	Percentage dead	Total sample	Percentage infected	Percentage dead
Half-way Wall	305	20.7%	8.2%	576	30.5%	14.1%
Observatory	39	10.2%	5.1%	30	23.3%	23.3%
South Haven } Medicine Break }	47	25.5%	19.1%	65	16.9%	16.9%
				56	37.5%	19.6%
Total	391	20.2%	9.2%	727	29.6%	15.1%

at Weston-super-Mare in Somerset (100 miles east) four days later, while another ringed in September 1964 was found dead at Hayle in Cornwall (105 miles south) also four days later. It is not known if any diseased ones survive and return to the colonies to breed, but work is in progress to find out.

It is thought that approximately 1,000 chicks out of 26,500 fledged on the island in 1964 were killed by the disease. It is known that Manx Shearwaters have a very low annual mortality after returning to the island as breeders and even as non-breeders, but unfortunately the mortality in the first year of life is not known. However, it seems unlikely that these losses due to disease would have any appreciable effect on the breeding population. There are very large numbers of non-breeders present in the colonies and it is possible that they might be capable of breeding if the colonies were not already overcrowded.

MODE OF INFECTION

In 1964 seven chicks which had been weighed daily from hatching, and which had developed normally, became infected. It therefore seems unlikely that normal chicks are any less susceptible than weak or undernourished ones. The factors which appear to effect the chances of an individual's becoming infected are its hatching date and the location of the colony. The majority of the chicks in 1963 and 1964 had fledged before the disease appeared and even then the disease did not spread to the very dense colonies.

Previous workers have suggested that the disease is spread by contamination through contact with fluid from burst blisters of infected birds. This could easily happen on walls and rocks where many young congregate to exercise their wings before leaving for the sea. That would then explain why the disease is always found near walls and isolated rock-outcrops among thick vegetation and never in the very large dense colonies where the soil is very soft and the vegetation extremely short (plate 64d).

Severe epizootics of this disease have been attributed to wet summers and the associated growth of dense vegetation (Dane, Miles and Stoker 1953), but this was not the case in 1964 when the rainfall from March to August (14.6 inches) was lower than in 1963 (17.5 inches) and 1962 (15.3 inches).

Dane, Miles and Stoker (1953) tentatively suggested that puffinosis might be primarily a disease of gulls, and certainly it or a closely related virus has been recorded from gulls on scattered occasions. However, between 1958 and 1964 I handled more than 1,000 full-grown and 6,000 young gulls on Skokholm and Skomer and only twice did I see blisters which might have been due to this disease. Both these were young Lesser Black-backed Gulls *Larus fuscus* on Skokholm in 1964. It is unlikely that the disease can regularly occur with any frequency in these gull populations unless there are different symptoms. Therefore, as it is so regular on Skokholm and Skomer (see later), it seems that on these islands it must be primarily a disease of young shearwaters. However, it is worth adding that in 1963 and again in 1965 some young Oystercatchers *Haematopus ostralegus* were found dying with blistered and swollen legs and feet; these were all in areas where puffinosis occurs and it is possible that they were suffering from the disease.

As the disease occurs in the same areas every year, the source of infection must remain from season to season. A virus could not overwinter on a stony surface and, even if it did, why do the early chicks not then contract the disease? It is therefore more likely that it overwinters in some invertebrate carrier, and Dane, Miles and Stoker (1953) have shown that the virus occurs in the Trobiculid mites which abound in the area.

DISCUSSION

The first probable record of puffinosis on Skomer was in 1908 (Gurney 1913), but there were no regular observations there until 1946 when a severe epizootic occurred. Further epizootics followed yearly to 1951, when observations ceased. Since 1960, when regular observations began again, there have likewise been annual outbreaks (D. R. Saunders), always in the same areas as the earlier ones.

The first case identified on Skokholm was in 1947, but Lockley (1942) described shearwaters in bracken areas in the 1930's, which were obviously affected by the disease. There were then no more records until four 'probables' in 1954 and a single one in 1956. However, epizootics were found as soon as the disease was looked for in 1962, 1963 and 1964, and it seems likely that previous cases were overlooked. A search of the recoveries of ringed young Manx Shearwaters found dead before fledging shows that, in many earlier years, young from the Gull Field and Half-way Wall colonies were recovered 'dead but not eaten'. The death rates of birds ringed in these areas and found dead before fledging were significantly higher than those from other

parts of the island. In addition, there were then much larger numbers of Great Black-backed Gulls *Larus marinus* on Skokholm than now and it seems likely that these would have removed the majority of the moribund shearwaters before they were found by human observers. It is concluded, therefore, that puffinosis probably occurs annually both on Skokholm and Skomer.

SUMMARY

Epizootics of a virus disease, puffinosis, occurred among young Manx Shearwaters *Procellaria puffinus* on Skokholm, Pembrokeshire, in 1962, 1963 and 1964. The development of the disease was followed in 1964 when about 4% of the chicks on the island died from this infection. The disease has been recorded only in shearwater colonies among dense vegetation where there are isolated rocks or walls; it seems that only in these conditions can it be transmitted. The time between infection and death was about six days. The method of infection is discussed and it is concluded that, contrary to previous suggestions, puffinosis is primarily a disease of young Manx Shearwaters. Epizootics occur annually on Skokholm and Skomer and the virus probably overwinters in an invertebrate carrier. An appendix gives histological details of blisters caused by the virus.

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Appendix. Histological examination of Manx Shearwater feet

By G. H. Green

Feet collected from Manx Shearwaters *Procellaria puffinus* found dead on Skokholm, Pembrokeshire, during the epizootics of 1963 and 1964 were fixed in formal-saline, and wax-embedded sections stained with haematoxylin and eosin were examined. Sections were also stained in an attempt to demonstrate virus inclusion bodies by phloxin-tartrazine and Leishman-Giemsa methods.

The blisters were found to form at first by the accumulation of fluid which splits the surface keratinous layer from the epidermis of the web (plate 65a). The epithelial cells beneath the blisters may show enlarged nucleoli or vacuolation of the cytoplasm in the early stages of the disease, but they are very rapidly destroyed and the whole epithelium becomes a necrotic mass infiltrated by acute inflammatory cells. The tense blister is soon broken and the stretched keratin collapses on to the remains of the necrotic epithelium. Secondary bacterial invaders may be shown in the intact blister, but are more obvious after it has been broken (plate 65b). Gram positive cocci are usually present and Stoker and Miles (1953) regularly isolated *Staphylococcus aureus* from blister fluid. Blisters may be formed on one or both sides of the web. The capillaries in the stroma of the web are often dilated (plate 65c) and the stromal connective tissues become infiltrated with inflammatory cells:

at times there is considerable haemorrhage into these tissues. In some cases, blisters are found on the toes or tarsus. Sections from these areas showed a similar appearance, but no damage to the underlying bone was observed.

Miles and Stoker (1948) and Stoker and Miles (1953) found acidophil cytoplasmic inclusion bodies in some of the cells of the epidermis. Similar bodies were observed by them in the ectodermal cells of the chorio-allantoic membrane of hens' eggs inoculated with bacteriologically sterile blister fluid. In the series of sections examined here, no inclusion bodies of any sort were found.

Sections from the foot of a young Lesser Black-backed Gull *Larus fuscus* collected on Skokholm in 1964 were similar in appearance to those from the feet of Manx Shearwaters, but showed rather less damage to the epidermis and less acute inflammation.

Studies of less familiar birds

136. Red-breasted Flycatcher

By Hubert Weber

Serrahn Biological Station, East Germany

Photographs by Ilse Makatsch

(Plates 66-67)

The Red-breasted Flycatcher *Muscicapa parva* breeds from central Europe through Russia and right across Siberia and northern Mongolia to Anadyr, Kamchatka and probably Sakhalin Island, with isolated populations in the Caucasus and northern Iran, and in the western Himalayas (Dementiev and Gladkov 1954, Vaurie 1959). In Europe it nests from southern Finland, the Baltic States, Denmark (occasionally), Germany, Austria, Hungary, Yugoslavia, Bulgaria and Rumania eastwards; in recent years the breeding range has expanded westwards (Niethammer 1951). The whole population migrates south-east and south to winter in India and south-east Asia (Grothe 1940). Consequently, the species is not common on passage in western Europe, but small numbers occur every year in the British Isles from August to November, especially in September and October, chiefly on the east coast, but also in the south as far west as south-west Ireland; occasional ones appear in late spring and summer (I. J. Ferguson-Lees *in litt.*). The notes which follow are largely based on my own observations in East Germany (see also Weber 1958).

In central Europe dense woodlands with high canopies are the favourite biotope. In the lowlands these are mainly beech, but in mountainous country mixed woods are also occupied if the proportion of conifers is not too high. The only places where the high canopy

plays no rôle in habitat selection are steep slopes (above 2,000 feet in the Adlergebirge and in the Bavarian Forest) where the species is also found in open pine woods with branches down to the ground and shows a preference for bushes among boulders. Population density varies greatly. In general the distribution is very sporadic and the species is relatively common in only a few places: for example, in the Reichensteiner Mountains in Mecklenburg, where it may attain a density of five pairs per 250 acres.

In Germany the Red-breasted Flycatchers normally arrive on the breeding grounds in the second ten days of May, rarely somewhat earlier. If the weather is unfavourable, however, they may not appear before the last ten days of the month. The first arrivals are males, mostly full adults with red throats. The females and the majority of the young males lacking the red arrive a few days later.

If the weather is favourable, the male begins to sing as soon as he has arrived. When a female appears, his song is intensified and courtship flights become more frequent. The songs of different males can vary greatly and so it is usually possible to recognise individuals. Song reaches its peak during pair formation; it is still quite considerable while the eggs are being laid, but ends when the female begins incubation. Unpaired males sing throughout the summer. In courtship flight the male flutters with quivering wings from branch to branch in a straight line for distances of up to 25 yards. At the beginning of this flight he utters hissing noises which sound like *tzt-tz-tzt* and remind one of the call of a Spotted Flycatcher *M. striata*. The male and female have a warning call in common—a rattling *zrrt-rrr* like that of a Wren *Troglodytes troglodytes*; a bird uttering this call often jerks its wings and tail. When the young are about five days old, both sexes begin to use an alarm note which sounds like *ilü-ilü* with the accent on the first syllable in each case and the second syllable short and not carrying far; when the young hear this note they at once become quiet. When threatening an adversary, both sexes utter a shrill *gschi-gschi*.

Courtship flight is followed by nest-hole advertisement. The male flies in turn to all the possible holes in trees and slips inside each one. Between these visits to holes he again sings assiduously and continues his courtship flight. The latter at times becomes a pursuit of the female, during which he calls *gzät-tek-gzät-tek* or utters short fragments of song. This phase continues until the female follows him into a hole.

Nest-building begins shortly after pairing and site-selection. I have been able to observe this at six nests and in each case only the female built, although in one exceptional instance I watched the male searching for material and taking it into the hole in her absence. Root fibres, moss, animal hairs and small stalks were among the items I saw collected. Often a female found it difficult to get into the narrow cavity with her burden.

In all, I have found 23 nests. Nine of these were more than 30 feet above the ground, but the lowest of all was only five feet up in a rotten beech stump. This 'stump nest', in the Serrahn Nature Reserve in Mecklenburg, proved very suitable for observation and it was here that I was able to obtain most of the breeding data summarised below. Most nests were inside holes in trees, but some were in deep forks, in cracks in bark or, in several cases, among the epicormic shoots of mature oaks. In 1935, in the forest district of Johannisberg near Jauernig, I found an openly sited nest in a bush of savin *Juniperus sabina* at a height of just over five feet. It was round like a Wren's nest; the outside was composed of moss and the inside of small stalks and animal hairs.

My observations at the 'stump nest' showed that on 22nd June 1956, 28 days after the first arrival of the Red-breasted Flycatchers, there were five eggs. After a few days I was able to move my hide up to a distance of only three feet from the nest. Both adults soon became accustomed to it and the incubating female did not even leave the nest when I came or went. During observations from the hide, the female dozed or slept for short periods at varying intervals; in doing so she would sink deep into the nest hollow with her eyes shut, but did not tuck her head into the feathers of her back. She turned the eggs an average of twice an hour and changed her position on the nest each time. The male also averaged two visits an hour to feed her as she incubated, but he came more often between 06.00 and 10.00 hours and between 16.00 and 18.00 hours than at other times. It was notable that the female used to notice the approaching male when he was still thirty yards away, even when he was concealed by leaves and uttering no sound. Possibly she heard either the noise made by his wings or the snapping of his bill when he caught an insect.

When the male brought food to the female on the nest, I was often able to note that she distinctly moved or opened her bill when he was still ten yards away. Often announcing himself with the first notes of his song, he usually approached by the same branches. As he arrived at the nest he uttered a low *tck-tck-tck* while the female, raising herself into a stooping posture and fluttering her wings, called *zirr-zirr*. Feeding was always quickly over, whereupon the male soon vanished again. The female did not incubate all the time, but left the nest about once an hour for between three and ten minutes.

On the morning of 1st July there were four newly-hatched young in the 'stump nest'; the fifth egg did not hatch. Incubation must therefore have begun about 19th June. For the first five days of their time in the nest the young were regularly brooded by the female, then from the sixth day to the eighth they were brooded only at night; after that the parents came to the nest only to bring food. During the first two days the female left the nest several times an hour for a maximum

of 14 minutes, returning from each of these excursions with food which she gave to the young; the male at this time brought food about three times an hour and part of that the female herself ate. On the first day the female alone fed the young direct, but on the second day the male did so sometimes and from the third day onwards he took over a good proportion of the feeding. During 47 hours of observation between the third and thirteenth days the female brought food 234 times and the male 201 times. On the first two days the faecal sacs dropped by the young were eaten at the nest by the female, but later both parents carried them out of the nest and ate them perched on branches near-by. From the second day onwards the young cheeped softly. On the tenth day we saw them preening for the first time and from the eleventh day they were exercising their wings at the nest. All four young left the nest during the afternoon of the thirteenth day. Fluttering and hopping, they moved about on branches near the ground. Two days later I saw the female with one of the young 200 yards from the nest and already able to fly well.

Under the guidance of their parents the young seek the nearest cover as soon as they have flown. This may be a group of young beech trees in a clearing in the leafy forest or, in mountainous country, perhaps a clump of elder bushes. In twos and threes, pressed against each other, they wait to be fed by the adults. Even when they become independent they still keep to thickets or young copses. The adults also keep to the undergrowth after the young have flown, particularly because their flight is somewhat hampered by the rapid complete moult which they undergo between mid-July and the beginning of August. The young have a slower partial moult which begins as soon as they have become independent and may last until the end of August; they sometimes start the autumn migration to north-west India as early as the beginning of August, before they have lost all their juvenile feathers. At Serrahn Biological Station, in fact, Red-breasted Flycatchers on passage are trapped, mostly in mist-nets, and ringed from July onwards. The last ones have usually left Germany by mid-September.

The food of the Red-breasted Flycatcher in the breeding season is mostly gathered from trees and branches, though some is caught in the air and a little taken from the ground. By putting rings temporarily round the necks of the four young in the 'stump nest' when they were ten days old, we took from them all the food that the adults brought during one hour. The weather was warm and sunny and we were careful to make sure that the young suffered no ill effects from this sampling. During the hour the male brought food 15 times and the female nine times. These samples were analysed by Dr. K. Bösenberg of the Seebach Bird Protection Observatory. They contained flies (Brachycera) of seven families, ants (Formicidae), noctuid moths

(Noctuidae) and their larvae, various beetles (Carabidae, Elateridae, Cerambycidae, Nitidulidae), shorebugs (Saldidae), woodlice (Isopoda), millipedes (Myriapoda) and spiders (Araneae). In August and September Red-breasted Flycatchers also readily take the berries of scarlet-berried elder *Sambucus racemosa* and common elder *S. nigra*.

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Notes

Turnstone feeding on dead sheep.—On 1st March 1964, a day of heavy mist, we were walking along the shore at Steart Point, Somerset, when we came across the carcase of a sheep. A Carrion Crow *Corvus corone* and two Great Black-backed Gulls *Larus marinus* flew from it and settled a short distance away. Part of the sheep's abdomen had been eaten away and on closer inspection we were surprised to see the tail of a Turnstone *Arenaria interpres* protruding from the partially exposed rib cage. The rhythmic movements of this tail suggested that its owner was feeding inside the thoracic cavity. As we circled round in an attempt to get a better view of what was happening, however, it backed out and, hopping on to the rib cage, paused there momentarily before flying to join a large flock of Turnstones on the shore.

The movements of the Turnstone's tail had certainly indicated a feeding action and, although we did not actually see it with flesh in its bill, we felt safe in assuming that it had been eating the viscera. The corpse was very fresh, still with uncongealed blood in the thoracic cavity, and we saw no crustaceans, insects or parasites on which the Turnstone might alternatively have been feeding.

COLIN SELWAY and MICHAEL KENDALL

[We do not know of any previous record of a Turnstone feeding on a dead mammal in Britain, but in a short paper entitled 'Feeding behaviour of the Turnstone in arctic Canada' (*Brit. Birds*, 55: 241-243) S. D. MacDonald and David F. Parmelee recorded Turnstones pecking at the fat and soft flesh on the carcase of an arctic Wolf *Canis lupus* and also feeding freely from the carcases of birds taken for museum specimens, including those of other Turnstones. This paper was accompanied by a photograph of a Turnstone at the Wolf carcase.—EDS.]

Unusual call of Nightjar.—At dusk on 8th June 1965, near Winchester, Hampshire, three of us were out listening to Nightjars *Caprimulgus europaeus*, about five of which could be heard churring, when I noted that one kept uttering a call which was new to me. This male repeatedly ended his churring with the repetition five or six times of a single note *clink*, starting rather fast but slowing down by the end of the series. These notes reminded me of the sounds made when a stick is thrust partly through the spokes of a rapidly revolving bicycle wheel, enough to bring it to a stop. Once, too, the same Nightjar uttered the call immediately before churring. The impression I got was that the *clink* was the churring very much retarded, a kind of slowing down at the end and getting under way at the beginning. My companions, who also heard this unusual sound, were Miss Joan Spurgin and Ralph Cook. C. SUFFERN

Blackbird carrying off shrew.—On 25th June 1965, I was watching a cock Blackbird *Turdus merula* hopping about on a garden path near Ambleside, Westmorland. An extremely tame and fearless bird fed regularly on household scraps, he allowed a very close approach and ignored me as I stood only about five feet away. My attention was diverted for a moment, and when I looked again he was worrying some object, beating it on the ground and shaking it and tossing it about with his bill. This proved to be a shrew *Sorex sp.*, perhaps a young one as it looked rather small, though it may have been a Pygmy Shrew *S. minutus*. After some two or three minutes of this treatment, the shrew became pulpy, though still entire and, I think, unpierced. The Blackbird then rolled it into a kind of ball and flew away with it in his bill to an adjacent wood where he was apparently feeding young. I do not know if he caught the shrew or found it dead. If the former, it must have happened very quickly as my attention had been diverted for scarcely 30 seconds. KATHLEEN M. HOLLICK

Starlings taking lizards.—In early May 1965, and again on 14th June, I saw a Starling *Sturnus vulgaris* carry a lizard, probably a female Common Lizard *Lacerta vivipara*, to its young in a nest under the roof of my house at Paignton, Devon. The same nest was involved on each occasion and so I assume it was the same Starling, or at least one of the same pair, feeding successive broods. In each case the lizard was minus its tail and, held by the neck, hung limply.

We have a largish front garden on a steep slope which is mostly rockery and there are often a number of lizards to be seen basking in the sun. It may well be that the Starlings catch them quite often, but these are the only two occasions on which I have seen one brought to the nest and *The Handbook* mentions only that 'frog, newt and lizard' have been recorded as prey in Holland. KENNETH A. RAY

Rose-breasted Grosbeak in Co. Cork.—At 13.30 hours GMT on 7th October 1962 we discovered a first-winter male Rose-breasted Grosbeak *Pheucticus ludovicianus* in a clump of bushes above Trawkieran on Cape Clear Island, Co. Cork. We had it in view for only about three minutes at a distance of some 30 yards before it disappeared, but at 16.45 hours we found it again, in exactly the same spot, and were then able to watch it at ranges down to ten yards almost continuously for the next hour and a quarter as it moved to Cummer and eventually into the Waist, between Trawkieran and Ineer. It spent the whole of the next day, 8th October, in a field overgrown with brambles in the Waist, but was not seen subsequently.

It was very large, almost as big as a Song Thrush *Turdus philomelos*, and heavily built, rather like a Hawfinch *Coccothraustes coccothraustes*. A large belly gave it a pear-shaped appearance when perched. In a rear view, it strongly resembled a huge Whinchat *Saxicola rubetra* with the mantle buff, strongly striped with dark brown, and very prominent pale superciliaries meeting on the nape. There was also, however, a buff crown stripe, which did not quite join the superciliaries on the nape. Its actions were very reminiscent of those of a shrike *Lanius sp.*, with strongly undulating flight on rounded wings and the habit of constantly wagging the tail both up-and-down and side-to-side while looking alertly around. In addition, there were three prominent white bars on the wings and a good deal of white showed in the tail in flight, which made us think particularly of comparing it with a Woodchat Shrike *L. senator*. The secondaries were all broadly tipped with white, while the upper tail-coverts had pale buff tips which formed a line of pale spots. A diamond-shaped orange-red patch on the breast was brightest on the chin and there was a very conspicuous white collar and a crescentic buff spot under the eye. The most striking feature, however, mainly visible in flight or when the bird flicked its wings, was the *brilliant crimson under wing-coverts* which were almost exactly the same colour as the red on a Great Spotted Woodpecker *Dendrocopos major*.

The grosbeak kept mainly to brambles and fed voraciously on blackberries, which it did not swallow but slowly munched, throwing the remains to one side with a flick of its head. When first seen, the huge conical bill was bright pink with greyish patches, but by the late afternoon it was stained a deep purple with blackberry juice. From this we concluded that the bird had probably not long arrived when we first found it.

The following detailed description is compiled from the field-notes which we made independently:

Upper-parts: crown dark brown, tinged olive, with pale buff central streak not quite reaching nape; broad creamy superciliaries extending right round on to nape and completely cutting off the crown, but becoming fainter and more buff

towards rear (the crown streak did not quite join the superciliaries); lores and ear-coverts dark brown, with large pale-buff crescent under eye; nape and mantle buff, very heavily striped dark olive-brown; rump dark buff, unstreaked; upper tail-coverts dark buff, with pale buff tips on outer feathers showing as line of pale dots; tail dark brown, the inner webs of at least the three outer feathers tipped white (this showing only in flight or when tail fanned); wings dark brown; three wing-bars formed by white median coverts, white tips to greater coverts (largest on innermost) and white bases to primaries; secondaries all broadly tipped white, producing effect of series of dots; under wing-coverts bright crimson, extremely conspicuous in flight or when wings raised; sometimes a small amount of crimson showing at the carpal joint even at rest. *Under-parts:* chin bright red; yellowish-red diamond-shaped patch on centre of throat, fading out on lower breast; sides of throat white, forming conspicuous white collar under ear-coverts, but not meeting on nape; dark line under this white collar extended right round lower throat, passing through the red of the centre of the throat (presumably this was the first signs of the black head of the adult male developing); sides of breast and flanks distinctly tinged yellowish-buff with prominent dark olive-brown streaks; belly and under tail-coverts off-white. *Soft parts:* eye dark; bill very large and heavy, stained with blackberry juice so true colour not seen: feet and legs grey, latter rather weak for size of bird.

It may be worth mentioning that when the Rose-breasted Grosbeak was first seen, a Subalpine Warbler *Sylvia cantillans* and a Red-backed Shrike *L. collurio* were also present in the same small clump of bushes! The period 5th-7th October 1962 had also produced a Melodious Warbler *Hippolais polyglotta*, two Icterine Warblers *H. icterina*, a Lesser Whitethroat *S. curruca*, a Firecrest *Regulus ignicapillus* and two Red-breasted Flycatchers *Muscicapa parva*, as well as small numbers of the commoner migrants at Cape Clear Island.

This constitutes the second Irish and European record of the Rose-breasted Grosbeak, an adult male having been seen in Co. Antrim in November 1957 (*Brit. Birds,* 53: 149-150).

M. P. L. Fogden and J. T. R. Sharrock

[This Rose-breasted Grosbeak occurred at a time when unprecedented numbers of American land-birds were recorded far out over the Atlantic (*Brit. Birds,* 56: 157-164) and two other passerine species are known to have reached the British Isles. The latter were two Red-eyed Vireos *Vireo olivaceus* on St. Agnes, Isles of Scilly, from 4th October onwards (*Brit. Birds,* 56: 462-464) and a Baltimore Oriole *Icterus galbula* in Sussex on the 5th and 6th (*Brit. Birds,* 56: 464-465). St. Agnes also produced three American waders in that week—a Lesser Golden Plover *Charadrius dominicus*, a White-rumped Sandpiper *Calidris fuscicollis* and a Least Sandpiper *C. minutilla* (*Brit. Birds,* 57: 124-125). In addition, we must again draw attention to the conclusions reached by Dr. I. C. T. Nisbet in his paper on 'American passerines in western Europe, 1951-62' (*Brit. Birds,* 56: 204-217) where the above record was included.—Eds.]

Goldfinch roost in Inner London.—Daily during the second half of December 1964 I noticed small-bird droppings on the pavement under a plane tree *Platanus acerifolia* 45-50 feet high in front of the Natural History Museum in Cromwell Road, South Kensington, London S.W.7. On 4th January 1965, at 3.50 p.m., there were ten or more Goldfinches *Carduelis carduelis* in this tree.

Two evenings later, on 6th January, I estimated that 40 Goldfinches were present at 3.50 p.m. By 4.05 p.m. activity had almost ceased, the birds being aggregated in two loose groups fairly high over the pavement, and by 4.30 p.m. they had clearly settled for the night. At 5 p.m. on 12th and 15th January about 40 were grouped in the lowest branches of the tree at a height of some 30 feet, their breasts illuminated by the fluorescent light from a lamp standard 25 feet high in the middle of the roadway and therefore only about five feet obliquely below them. These branches, which were probably within 15 feet of the tops of passing buses, were frequently occupied until the middle of March.

Stanley Cramp was able to visit the site at 4.10 p.m. on 23rd January. Thirteen Goldfinches were already present, and he counted more coming in from the south-west until there was a total of 105. The birds moved from tree to tree, apparently feeding on plane seeds, and finally settled to roost in two planes on the east side of Exhibition Road, about 200 yards from the tree in Cromwell Road.

I continued observations at weekly or more frequent intervals until 6th April, when the lengthening evenings made it impossible for me to wait for the birds to come in before I left for home.

Stanley Cramp's visit coincided with a temporary but almost complete desertion of the tree in front of the Natural History Museum that lasted until about 5th February. During that time, an estimated 60-70 Goldfinches roosted in loose groups at about 35-45 feet in the lower branches of a large plane 75-80 feet high within the railings at the south-east corner of the Science Museum in Exhibition Road. On 5th February there were about 60 in this tree and some 20 in the original one in Cromwell Road. By 12th February the tree in Exhibition Road had been deserted, but 50-60 were settled for the night in the Cromwell Road one at 4.55 p.m.

Circumstances did not often permit a count to be made of the birds as they came in, but I estimated between 30 and 40 up to the end of February. Numbers declined in March, and the final count on 6th April was only 13.

The Goldfinches were never seen in the vicinity of the Natural History Museum at 9 a.m. or between 1 p.m. and 2 p.m., and it is not known where they spent the day. They came in singly or in small parties of up to five, chiefly from the south-west, between an hour and a half and an hour before sunset. Before settling down, many of them pecked at the seed balls of the plane trees, apparently feeding, and on

one occasion a party of three went down to a piece of waste ground that carried a growth of tall weeds. An examination of a few plane seeds showed that each contained a very small quantity of possibly edible material. W. RUTTLEDGE

[We do not know of any previous record of a communal urban roost of Goldfinches.—EDS.]

House Sparrow carrying dead nestling.—On 20th June 1965, in Coventry, Warwickshire, I saw an adult male House Sparrow *Passer domesticus* land on a lawn and then fly off immediately, leaving behind him a dead nestling. The latter, apparently a House Sparrow several days old, had well-developed quills with the feathers beginning to emerge. I am quite certain that there was nothing on the lawn before the male flew down and so there was no question of his returning to a corpse that was already there. He must therefore have been carrying the dead nestling. Had the corpse been in his bill, I feel sure I would have seen it and so I concluded that he must have carried it under his body. W. G. LUTON

[Dr. J. D. Summers-Smith, author of the monograph on *The House Sparrow* (1963), has commented as follows: 'Mr. Luton's note is interesting in view of some observations published by A. H. Scott (*Avic. Mag.*, 1941: 50-57 and 94-101). Scott used to breed House Sparrows in a very large aviary and was able to establish that, after he had disturbed a nest by ringing the young, the parents tried to carry the nestlings, in some cases successfully, to other nest-boxes up to 24 feet away. These observations concerned live young and, in the instances where Scott actually saw the nestlings being carried, they were held in the adult's bill at the junction of wing and body; nevertheless, the two sets of observations—his and Mr. Luton's—could be related and it is perhaps possible that in the present case the nestling was accidentally killed while being carried. Since reading Scott's paper, I have often wondered whether some of the numerous unfledged dead nestlings found near colonies of House Sparrows could possibly be the results of unsuccessful attempts to move them to a different nest.' Alternatively, since House Sparrows have been recorded carrying live nestlings, they may use similar methods to remove a corpse from the nest and take it some distance away, although one would still expect the adult to use its bill for carrying. Among European passerines, only shrikes *Lanius spp.* and crows *Corvus spp.* are known sometimes to carry prey in their feet. The other alternative, gripping the corpse between the thighs, seems even more unlikely. Clearly, in fact, Mr. Luton's note raises a number of interesting points and problems and we should be very interested to have any other observations which might throw light on this behaviour.—EDS.]

Letters

The wing pattern of the female Great Bustard

Sirs,—In his recent article on 'Flight patterns of the European bustards' (*Brit. Birds,* 58: 43-47), Philip J. Stead wrote with reference to the Great Bustard *Otis tarda*: 'The wing patterns of both sexes are similar—a broad white band along the upper primaries and secondaries running almost the full length of the wing, the trailing edge of which is black.' I should like to qualify this statement.

In my experience of Great Bustards in Austria, near the Hungarian border in April 1963 and 1965, the females could easily be distinguished in flight by the oblique white band along the wing being *considerably narrower and less conspicuous.* My impression was that the wings of the males had more white than dark, and those of the females more dark than white. The sketches of Great Bustards in flight on page 45 of Mr. Stead's article are applicable to males only. The females lack at least two-thirds of the more extensive white area towards the leading edge of the wing. Even so, however, the white strip is considerably broader than the narrow pale grey strip shown in Mr. Stead's sketch of the Houbara Bustard *Chlamydotis undulata.* P. G. R. BARBIER

[We showed this letter to Mr. Stead and his comments appear below.—EDS.]

Sirs,—I would not deny that the wing patterns of the male and female Great Bustard differ slightly, which is the reason why I used the word 'similar' rather than 'the same' when referring to them in my article. This difference derives from the great disparity in size between the sexes and the fact that the body weight and wing area of a bird do not vary in the same ratio. Hence the female Great Bustard has narrower and more pointed wings in relation to its total size and, consequently, the area of white on the wing is reduced.

Frankly, however, I think that Mr. Barbier is splitting hairs: the wing patterns of the two sexes are basically the same and I cannot imagine anyone failing to identify a female Great Bustard from my drawing of the male. My reason for not illustrating the female was simply that it would have taken up too much room on the page and I would have had to reduce the sizes of the other bustards to include it.

PHILIP J. STEAD

Gulls preying on adult petrels

Sirs,—In his note on gulls preying on adult Storm Petrels *Hydrobates pelagicus* (*Brit. Birds,* 58: 219-220), R. Long has overlooked the photograph by D. F. Lawson of pellets ejected by Great Black-backed Gulls *Larus marinus* on Skokholm, Pembrokeshire, which was published in

this journal in 1953 (*Brit. Birds*, 46: plate 4), although it was not specifically stated at the time that the Storm Petrel remains shown were those of an adult.

The predation of Storm Petrels by gulls is a regular feature of sea-bird ecology on Skokholm. The effect of gulls on the population of any sea-bird, especially on that of a small nocturnal species, is very difficult to ascertain, but during 1963 and 1964 at least 64 fully-grown Storm Petrels are known to have been killed on Skokholm out of a total population of several thousand. The majority were eaten by Great Black-backed Gulls, but lesser numbers were also taken by Herring Gulls *L. argentatus* and Lesser Black-backed Gulls *L. fuscus*. Almost all nests of Great Black-backed Gulls had some petrel remains present. Adult Storm Petrels on Skokholm are also known to be eaten by Little Owls *Athene noctua* and Short-eared Owls *Asio flammeus*. D. R. Saunders informs me that on the adjacent island of Skomer, where there are many more Great Black-backed Gulls than Storm Petrels, he has only once in six years found an adult Storm Petrel in a Great Black-backed Gull's nest. M. P. Harris

Sirs,—There is no doubt that the Great Black-backed Gull is the Storm Petrel's worst enemy. Some years ago, a pair of these gulls settled for the first time on a small island in the Minch, the straits between the Hebrides and the Scottish mainland, where a colony of Storm Petrels had until then nested undisturbed. Soon the wings of adult petrels began to appear on the grass at the nesting site of the gulls. By the end of the season quite three-quarters of the colony had been wiped out. On the flat, grassy top of another island in the Minch a number of these large gulls nest regularly. At the close of the summer the short grass is littered with the wings of adult Storm Petrels. Presumably the gulls stand on the alert in the evening when the petrels leave their burrows, or await their return in the early morning.

It is remarkable that the species is able to stand up to these continued raids. Seton Gordon

Sirs,—Many of your readers will recall that the autumn of 1952 saw an unprecedented wreck of Leach's Petrels *Oceanodroma leucorrhoa* in Britain and Ireland, during which the total casualties were probably not less than 6,700. This unhappy event was analysed and discussed in an excellent paper by Hugh Boyd (*Brit. Birds*, 47: 137-163), which dealt in detail with the numbers involved and the causes of the catastrophe, but which inevitably had to omit many individual experiences. In this connection, R. Long's recent note has brought vividly to mind the sad day during that wreck when Hugh Boyd and I watched many stranded Leach's Petrels being preyed on by gulls.

This was on the afternoon of 27th October 1952, over a period of four hours or more, in the estuary of the River Severn between the New Grounds and Frampton-on-Severn, Gloucestershire. As we made our way along the sea-wall we estimated at least 160 Leach's Petrels in flight and a further 100 stranded on the sand-banks; most of the latter were in a distressed condition and some were already dead. In addition, a few were to be seen 'hedge-hopping' in the fields bordering the estuary; these were quickly carried further inland by the gale-force westerly winds. Many dozens of Herring Gulls, aided by a few Great Black-backed Gulls, were mauling the stranded petrels. Some were jabbing them with their bills or picking them up and shaking them vigorously, while others were flying up into the air with them and dropping them from a height. Many of the petrels were obviously maimed or killed outright, but only a few were actually seen to be swallowed by either Herring Gulls or Great Black-backed Gulls. In conclusion, by far the most numerous of the gulls in the area were Common Gulls *L. canus*, but on no occasion did we see any of these attack the petrels.
BERNARD KING

Bullfinches feeding on honesty

Sirs,—Dr. Bruce Campbell's note on Bullfinches *Pyrrhula pyrrhula* feeding on the 'pennies' or seeds of honesty *Lunaria annua* (*Brit. Birds*, 58: 223-224) prompts me to say that these birds have regularly done the same thing in our garden at Virginia Water, Surrey, ever since we came here in 1948. Usually two pairs of Bullfinches are resident in the vicinity. Not only do they take the seeds of honesty, but they also make a dead set at the flowers and buds on individual plants. Incidentally, they also eat the green seeds of golden rod *Solidago* and perennial larkspur *Delphinium* and the seeds of forget-me-not *Myosotis*.
DOUGLAS CARR

News and comment

Edited by Raymond Cordero

Ainsdale Sand Dunes National Nature Reserve.—The Nature Conservancy have purchased 1,216 acres of sand dunes between Ainsdale and Formby on the Lancashire coast and the area has now been statutorily declared as the Ainsdale Sand Dunes National Nature Reserve. It is Great Britain's 112th National Nature Reserve and the first to be established under the new Nature Conservancy seal on behalf of the Natural Environment Research Council, of which the Conservancy became part when the Council was set up on 1st June 1965.

The new reserve includes foreshore, dunes and moist slacks, which are crossed by a public footpath, and a stretch of planted pinewood extending northwards. At its

northern end it overlaps Southport Sanctuary, a beach of 14,500 acres which was established in 1956 as a National Wildfowl Refuge.

The range of conditions in the dunes favours an unusually interesting and varied flora and fauna, providing excellent opportunities for research which the Conservancy will develop. Unfortunately the former scientific interest has been much reduced in recent years; for example, the breeding colonies of sea-birds have been driven away by disturbance. Studies in conservation will be of particular importance and will help the Conservancy in their primary duty of rehabilitating the reserve. It is also intended to establish a centre to take advantage of opportunities in environmental education.

Shetland reserve for Nature Conservancy.—The Nature Conservancy has been generously offered the Ronas Hill area of the Busta and Ollaberry Estates in Mainland, Shetland, by the proprietor, A. S. Cussons. This area, which will become a National Nature Reserve in due course, includes several stacks and skerries and some twelve miles of coast with cliffs rising to a maximum height of about 750 feet. The proposed reserve, expected to be not less than 7,000 acres, is one of the most interesting botanical areas in Shetland and also has a good population of breeding birds, including Red-throated Divers, Great and Arctic Skuas and various other species of sea-birds.

Lead poisoning of captive wildfowl.—Lead poisoning, following the ingestion of spent shotgun pellets, has been found to be an important cause of death among captive wildfowl at the Slimbridge collection of the Wildfowl Trust. In a paper in the Trust's 1963-64 annual report, J. V. Beer and P. Stanley say that the pellets finding their way into the birds are two or more decades old, deriving from the time when the area was used widely for shooting. Lead poisoning of wildfowl in other British collections has been diagnosed recently and, as it is difficult to cure, methods of prevention are important, say the authors.

Skokholm to Galápagos.—Dr. M. P. Harris has recently given up the post of warden of Skokholm Bird Observatory on being awarded a Scientific Research Council grant to carry out ornithological research in the Galápagos, that fascinating group of islands off the west coast of South America. He was the first Skokholm warden to be appointed jointly by the Field Studies Council and the Edward Grey Institute (of which he remains a member) and during his three seasons on the island he has initiated long-term population studies on Oystercatchers and Manx Shearwaters. One of the first results of his shearwater study appears in this issue and other papers are to be published elsewhere shortly. Dr. Harris expects to be in the Galápagos about two years and hopes to concentrate on the breeding biology and comparative ecology of three species of storm petrels.

Seabird Group formed.—The Seabird Group is an informal body recently set up by ornithologists interested in the seabirds of the waters surrounding the British Isles 'to arrange for the circulation of news on work in progress and to promote the development of co-operative research'. It is at present run by a preliminary committee of people from a number of different areas concerned with different aspects of the study of seabirds, including representatives of the staff of both the British Trust for Ornithology and the Royal Society for the Protection of Birds. It is hoped in time to secure recognition as a specialised committee of existing organisations, or, if this should prove impossible, the organisation of a separate Seabird Society may be considered.

At the present time the group is asking prospective members to inform it of their names, addresses, interests and activities and the addresses of other people likely to

be interested, and for a donation of 5/- or more towards administrative expenses, pending the outcome of negotiations with other bodies on its final status. A Bulletin has been issued, and is available from the provisional secretary and editor, Dr. W. R. P. Bourne, Shrodells Hospital, Vicarage Road, Watford, Hertfordshire.

Four bird observatory reports.—It would obviously be impossible to review regularly all the local publications on birds which now appear annually, but we must make some reference to four British and Irish observatory reports which have come to hand recently, representing as they do countless hours in the field and at the desk on the part of many of our keenest ornithologists. Cape Clear's report for 1964, compiled by J. T. R. Sharrock and available at 5/- from Mrs. E. Sharrock, 97 Bromham Road, Bedford, is in printed form for the first time and includes not only the systematic list, but also an interesting article on the sources of error in sea-watching. The latest St. Agnes report, edited by J. L. F. Parslow and obtainable at 3/6 from him, c/o Edward Grey Institute, Botanic Garden, Oxford, covers both 1963 and 1964, as does the Dungeness report which is priced at 4/- from H. A. R. Cawkell, 6 Canute Road, Hastings, Sussex. Finally—unfortunately in more ways than one—we have the Selsey Bill report for 1964, compiled by B. A. E. Marr, cyclostyled, and costing 3/6 from him at 59 The Green, Southwick, Sussex; this is the sixth report of its kind and the last one, for this interesting Sussex venture has been forced to close by the expansion of the town of Selsey which has used up every piece of open ground on the Bill.

Birds in stamps.—Birds and stamps have been ingeniously combined in an interesting wall chart recently issued by Educational Productions Ltd., East Ardsley, Wakefield, Yorkshire. The chart, which costs 3/-, measures 25 inches by 37½ inches, is in full colour, and depicts 72 stamps which show birds. It is divided into three sections: one of birds which might be seen in Britain, one of overseas species and a third of rare ones in need of protection. It has been produced in conjunction with the Stamp Collecting Promotion Council in collaboration with the World Wildlife Fund and should be valuable in schools for stimulating an interest in birds and protection.

The birds of Dorset.—The Reverend G. W. H. Moule has compiled a useful 20-page *A Revised List of the Birds of Dorset, up to 1962*. It is intended to bring F. L. Blathwayt's list of 1946 more up to date and it includes, of course, the Portland Bill records. The list is reprinted from the Proceedings of the Dorset Natural History and Archaeological Society and, while one is grateful to that organisation for publishing the list, it is a pity that the reprint had to wait until 1965.

A revised B.T.O. field guide.—In 1950 the British Trust for Ornithology issued *How to Choose and Use Field-Glasses* by E. M. Nicholson. It was enlarged by J. R. Hebditch in 1953, and with the fourth edition in 1961 the title was changed to *Binoculars and Telescopes for Field Use.* This year sees the fifth edition, revised by A. C. Atkinson. Such a publishing history shows how valuable the guide has proved; it is highly recommended to anyone about to embark on the important task of choosing his field optical equipment and costs only three shillings.

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British Birds

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Observations on the breeding biology of the Razorbill

By W. J. Plumb

Edward Grey Institute, Oxford

INTRODUCTION

HE BREEDING BIOLOGY of the Razorbill *Alca torda* has been little udied. Even the incubation and fledging periods were only in-ccurately known until the work of Keighley and Lockley (1947 and 48). However, Paludan (1947) gave a good general account of the ology, dealing especially with behaviour, and short papers have since ppeared on individual aspects of breeding. Some of the latter will be entioned later in the present paper which is based on work carried t on Skokholm, Pembrokeshire, during the summer of 1964.

PRE-NESTING PERIOD

1964 Razorbills were already on the cliffs by 29th February. No nificant correlation could be found between the numbers inshore d the prevailing weather on any particular day, though they tended remain at sea when it was extremely rough. Lockley (1953) served the same tendency among Puffins *Fratercula arctica* and this o applies to Guillemots *Uria aalge*.

The Razorbills visited the cliffs more frequently towards mid-April d most had settled there by the end of that month. When my servations started on 29th February they were already closely associ-d in pairs, each male maintaining around his mate an area from ich all others were driven. Conder (1950) called this area the ated female distance'. It is not clear whether pair formation occur-l at sea or during the first visits to the cliffs. There was no evidence promiscuity during the pre-nesting period.

Nest sites were probably taken up during or soon after the first visits to the cliffs. This point was clearly checked in the Guillemot, in which single bridled birds in three colonies occupied the same positions on the ledges from the time of arrival right through the breeding season. Pairs of Razorbills stood by future nesting sites throughout the pre-breeding period, and three colour-ringed individuals nested in mid-May in sites which they had occupied from at least mid-April.

Copulation was first seen on 27th March, but did not become frequent until after 21st April and was last observed on 15th May.

EGGS AND INCUBATION

The first egg was found on 21st April, an early date, first layings on Skokholm normally occurring between 8th and 14th May. Witherby *et al.* (1941) gave the first laying dates as 9th or 10th May, exceptionally late March. The laying span for eggs in the main study area covered a period of 38 days from 5th May to 10th June, although over 80% of laying occurred in a period of 17 days in mid-May (10th to 26th May).

Moyse (1962) and Diamond (1963), both working on Skokholm, discussed the dimensions of Razorbill eggs. In the present study 186 eggs were measured; the results are shown in table 1. A histogram of the ratio of the length to the diameter gives no indication that the shape of the egg is independent of its size as suggested by Moyse. The 1964 results agree very closely with those of Diamond in this respect.

The average weight of 47 fresh-laid eggs was 92 grams, with extremes of 80 and 107 grams. There appeared to be no seasonal variation in the weights of eggs, both light and heavy eggs occurring throughout the period. Paludan (1947) obtained an average weight of 95.6 grams for fresh-laid eggs of the slightly larger race *Alca torda torda*. His figure represents 12.7% of the average body weight of an adult, compared to 14.5% for *A. t. islandica* in the present study. Brun

Table 1. Measurements of 186 eggs of Razorbills *Alca torda* on Skokholm, Pembrokeshire, in 1964

Minimum length	66.5 (× 45.2) mm.
Maximum length	80.5 (× 49.2) mm.
Mean length	72.3 mm.
Minimum diameter	42.2 (× 80.0) mm.
Maximum diameter	51.2 (× 76.3) mm.
Mean diameter	47.0 mm.
Minimum volume	62.5 cc.
Maximum volume	105 cc.
Mean volume	79.7 cc.
Minimum length/diameter	1.45
Maximum length/diameter	1.97

(1958) gave the average weight of 31 eggs as 78.1 grams, but did not state the age of the eggs. During incubation the egg lost weight slowly but steadily until the last week when weight was lost more rapidly. The weight lost varied between 8 and 17 grams from the date of laying to the first sign of chipping.

A wide range of nest sites is used. Most sites on Skokholm are under boulders or on sheltered ledges, but only rarely is a typical Guillemot site used. Some nest in the entrance of old Rabbit or Puffin holes and two cases were known of nests in the entrances of occupied Puffin holes. Crevices and cavities in the cliffs are other common sites. It is probable that ledges are used only when all the available holes are already occupied.

Sandstone chippings were frequently found piled around eggs, both in holes and on ledges. On ledges the chippings clearly prevented the egg from rolling. The absence of chippings around eggs in other similar sites suggests that such 'nests' are only made when the materials occur in the near vicinity of the egg. A nest on Skomer, Pembrokeshire, was composed of plant fragments and Paludan (1947) published a photograph of one made of torn-up plant material.

INCUBATION PERIOD

The incubation periods obtained by different authors are given in table 2. In the present study two quite abnormal incubation periods were found and are excluded from the averages in the table. One egg took 44 days to hatch and another the remarkably long time of 52 days. No reason could be found for these long periods. In both cases incubation behaviour seemed to be as regular as at all the other nests. It is conceivable that a replacement laying might have occurred in the second case, but this was definitely not so in the first.

In the main study area a total of 86 eggs was laid by 80 pairs of Razorbills. This figure includes a double clutch and at least five replacement eggs. Fifty-nine eggs, or 69%, hatched during the course of 31 days, with 50% of the hatchings occurring in the eight days between 19th and 26th June. Of the 27 eggs lost, twelve failed through desertion and nine were broken by the parents, often by rolling them

Table 2. Incubation periods of Razorbills *Alca torda* on Skokholm, Pembrokeshire, in 1964, compared with previous studies

	Paludan (1947)	Keighley and Lockley (1948)	Present study (1964)
Average (days)	35.5	34.3	36.2
Extremes (days)	35-36	33-36	34-39
Number measured	7	18	29

Table 3. Five replacement layings by Razorbills *Alca torda* on Skokholm, Pembrokeshire, in 1964, compared with two recorded by Paludan (1947)

	Paludan		Present study				
Number of days between laying and loss	1	13	1	1	3	7	11
Number of days between loss and replacement	17	14	14	18	16	14	13

down a slope from their holes on to the rocks below; the remaining six disappeared from their holes and might conceivably have been taken by a predator though there was no direct evidence for this. There was also no evidence for infertility.

Five cases of replacement layings were recorded in 1964. Eggs were identified as replacement layings when they appeared in marked nests occupied by colour-ringed adults which had lost their first egg. The only previous author to mention replacement layings was Paludan (1947) although this habit is well known for the Guillemot. Table 3 summarises my data for relayings along with those of Paludan.

Replacement laying in the Razorbill can occur if the first egg is lost within 13 days after laying. The replacements took from 13 to 18 days to be laid, this period being apparently independent of the interval between laying and loss of the first egg and probably depending more on the physiological condition of one or both parents. Of 13 eggs lost, only five were replaced and the others not, even when the first egg had been lost within seven days of being laid. Two of the replacement eggs were lost within six days of being laid, but no third egg followed. Unless relaying occurred, the adults continued to occupy the site from a few days to two weeks and then left the area completely. Only a relatively small number of individuals relay after losing their first egg, unlike Guillemots, which frequently lay replacements. This is presumably related to the great risk of a Guillemot losing its egg from its precarious nesting place. The normally safer eggs of the Razorbill do not face the same dangers and the ability to lay replacements has apparently been much reduced. It appears to have been lost altogether in the Puffin, which has the safest site of the three.

Witherby *et al.* (1941) stated that two-egg clutches occur rarely, and there are few records for Skokholm (e.g. Diamond 1963). What was considered to be a double clutch was found in my study area in a cavity only large enough for one pair of Razorbills. The second egg was laid 17 days after the first, which is equivalent to the period required for the laying of a replacement egg. Both eggs were very similar in colour and pattern, but the second egg was smaller and lighter in weight than the first. The clutch was deserted a few days after the laying of the second egg, although only the first egg had been incubated in that time, the second being cold at all visits to the nest.

Table 4. Fledging periods of Razorbills *Alca torda* on Skokholm, Pembrokeshire, in different years

	Keighly and Lockley (1948)	Brun (1958)	Present study (1964)
verage (days)	15.7	18	18.5
xtremes (days)	12-18.8	16-21.5	14-24
umber measured	18	19	34

an earlier paper, Keighley and Lockley (1947) listed 16 other fledging periods om the year before with extremes of 10 and 18 days, but some had been estimated comparison of chicks of unknown age against those of known age and so these ve been omitted here; the six that were known accurately averaged 15.7 days like those in the later study

FLEDGING AND BREEDING SUCCESS

ne fledging periods recorded by different authorities on Skokholm e compared in table 4; in addition, Paludan (1947) obtained about 16 ys as the fledging period in Denmark. The course of 'flying out' ccupied 31 days, mainly in the first 15 days of July, only four chicks maining after 15th July.

Forty-six chicks out of the 59 which hatched developed to the fledg-g stage, giving a fledging success of 78%. Table 5 compares the tching, fledging and breeding success of the Razorbill on Skokholm different years.

In 1964 nine chicks were found dead in the nests at stages varying om one to 13 days. Two of these had their heads pecked (by the rent?) and one had been crushed, presumably by the parent. The her six died after gaining weight at the normal rate and the cause of ath in these cases was not determined. Four chicks disappeared om their holes without trace and were possibly taken by predators.

The total breeding success was 53%, 46 chicks being reared by 80 rs. As can be seen from the tables, the greatest losses were incurred the egg stage in all three years though the chick mortality was much gher in 1964 than in 1948 or 1958.

ble 5. Hatching, fledging and breeding success of Razorbills *Alca torda* on Skokholm, Pembrokeshire, in different years

	Keighley and Lockley (1948)	Brun (1958)	Present study (1964)
mber of eggs laid	50	31	86
mber of eggs hatched	18	20	59
ching success	36%	65%	69%
mber of chicks fledged	18	19	46
dging success	100%	95%	78%
al breeding success	36%	61%	53%

Table 6. Comparison of breeding success of early and late nesting Razorbills *Alca torda* on Skokholm, Pembrokeshire, in 1964

	5th-18th May	19th May-6th June
Number of eggs laid	48	38
Number of eggs lost	13	14
Number of chicks lost	4	9
Breeding success	65%	40%

If the breeding season is arbitrarily divided into two sections, one containing the early layers and the other the later layers, it is found that the later group lost relatively more eggs and young than did the earlier group. This is shown in table 6. The criterion for the division is the middle of the peak of egg-laying which fell between 14th and 22nd May, over 50% of the eggs being laid in those eight days. The difference in breeding success in the two groups is considerable. It is probable that the early breeders are older and more experienced than the later breeders which are likely to be younger birds, ones breeding for the first time or ones nesting in sub-optimal sites. The age structure of the colony was not known so the above hypothesis could not be checked.

This difference in efficiency between early and late breeders does not appear to be reflected in either the growth rates of the chicks or in the fledging periods of the chicks. Both of these features seem to be equally variable throughout the breeding season.

GROWTH OF THE CHICK

Chicks showed great individual differences in their growth rates. The average weight at hatching was 62 grams. The weight increase on the second day was small, between two and five grams. At this age the chicks still had a fairly large yolk sac and this was not completely absorbed until about the third day. Generally the weight of the chicks increased by about ten grams daily until around the twelfth day, after which slightly lower weight increases were recorded. Weight losses were recorded only during the last four to five days in the nest and these were small. At fledging—18 to 19 days—the average weight was 189 grams, or about 30% of the adult weight. Brun (1958) found the weight of the chick at fledging to be 28% of the adult weight. He also found wing length to be a much more reliable guide than weight to ageing chicks.

TWINNING EXPERIMENTS

This work was carried out in order to determine whether one chick is the most that can be raised by a Razorbill pair. Twelve pairs of Razorbills, in a colony away from the main study area, were given two

icks to rear. In these experiments two one-day old chicks were ired except in the cases mentioned below. Their growth rates ere compared with those of normal single-chick broods. The rents readily accepted the introduced chick and appeared to be able brood both chicks without difficulty. On introduction, however, th chicks pecked furiously at each other and in several cases the ads of both became denuded of feathers and blood was drawn.

Eight twins lost one of the pair after one to six days. Six of these icks disappeared from the nest without trace, another was found at e bottom of the cliff where it had presumably been pushed by its rtner, and the eighth had been battered to death. In the ninth inning the original chick died after five days from starvation; it d lost 10 grams and at 43 grams was the lowest weight recorded om any chick in the study. In the remaining three twinnings both icks left the nest alive; as these showed certain individual differences ey will be considered separately as A, B and C.

In twinning A a second chick aged three to five days was added hen the original chick was one to two days old and both fledged on e same night 19 days from the start of the experiment. The fledging eriod was therefore slightly longer than average. The weights of ese twins at fledging were 161 grams and 167 grams respectively and erefore a good deal lower than the average of 189 grams. The riginal chick was also stunted in growth although it was close to e introduced chick in weight. Hence the survival of these chicks ter fledging may well have been impaired.

In twinning B the introduced chick (added on the day of hatching) ined weight more rapidly than the original and fledged in 13 days hen it weighed 150 grams. Its partner was fed on the fourteenth day shown by an increase in weight; thus one parent at least had stayed hind with this chick, which left on the fourteenth night weighing 159 ams. In this case, then, the fledging period was four to five days orter than the average and the fledging weights were well below erage; this premature fledging could well have impaired their bsequent survival.

Twinning C was started with both chicks approximately five days old. he introduced chick gained weight more rapidly than its twin and left n the thirteenth day when it was about 18 days old. The original ick remained behind, lost weight rapidly and disappeared after the venteenth day when it weighed only 97 grams. It had, however, veloped its wing feathers and resembled a normal fledgling except r its very low weight. During the stay of this chick at the nest yond the departure of its twin, one parent was in attendance at the st at each visit, but evidently the chick was not being fed.

Thus in two, or perhaps three, of the twelve twinnings both of the

chicks left the nest alive, but probably with a reduced chance of subsequent survival compared with single chicks. Each of the other pairs successfully reared one chick, but these remaining chicks were not weighed so it is not certain whether they had as good a chance of subsequent survival as normal chicks. Hence the experiment suggests that it is at the least extremely difficult for a pair of Razorbills to raise more than one chick.

ACKNOWLEDGEMENTS

The work was carried out during the tenure of a grant from the Department of Scientific and Industrial Research. Grateful thanks are also due to the Field Studies Council for making it possible to work on Skokholm and to Dr. David Lack for reading and criticising the manuscript.

SUMMARY

Observations were made on the breeding biology of Razorbills *Alca torda* on Skokholm, Pembrokeshire, during the summer of 1964. Nest-site selection probably occurred during the birds' first visits to the cliffs in early spring. Weights and dimensions of eggs are summarised and discussed. The average incubation period was 36 days and the hatching success 69%. Replacement laying occurred in five out of 13 cases where the first egg was lost. The fledging period was 18.5 days and the fledging success 78%. The total breeding success was 53%, the earlier nesters having a higher success than the later ones. The growth of the chicks is briefly discussed. Out of twelve pairs experimentally provided with a second chick, only two, or possibly three, reared both chicks to fledging and these young were below the normal weight.

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Yellow Warbler on Bardsey Island: a bird new to Great Britain and Ireland

By George H. Evans

DURING THE AFTERNOON of 29th August 1964, at approximately 15.30 hours GMT, my newly arrived assistant H. Miles was conveying his belongings from the boathouse to the observatory on Bardsey Island, Caernarvonshire. Halfway between the boathouse and Ty Pellaf, his attention was attracted by a small, bright yellow, warbler-like bird which appeared suddenly and briefly atop a hedgerow at close range. Only very general impressions were obtained, but the sheer vividness of its coloration rendered it quite unlike any species with which he was familiar. In his encumbered state, and lacking binoculars, H.M. made no attempt to pursue it. Though puzzled by its identity, he assumed it was probably a variant Willow Warbler *Phylloscopus trochilus*.

Some two hours later a small party of visitors led by R. F. Durman left the observatory to undertake a short spell of mist-netting before the day's light faded. A net sited in Cristin withy bed was duly erected and the surrounding area driven. During this drive R.F.D. observed what was manifestly the same bird seen by H.M. earlier in the day. I was summoned and obtained good, if fleeting, views with comparative ease.

My first response was one of incredulity. Though palpably of warbler species, it possessed a vivid coloration quite different from anything I had seen before—the entire head, breast, belly and vent being a pure primrose-yellow. The mantle was very greenish and noticeably darker than the crown. The wing feathers were dark and prominently edged off-white. No superciliary could be discerned nor any sign of breast markings (though some faint reddish-brown streaks were seen on the breast when the bird was later in the hand). The eyes appeared black and rather large; the bill was pale horn and the legs somewhat darker. Its demeanour was not strikingly different from that of a *Phylloscopus*. When undisturbed it moved actively and usually at or just below canopy level, appearing in full view briefly before darting out of sight. Its movements were agile and fast. No fly-catching sallies were observed nor wing-flicking and it remained quite silent. There were no indications of nervousness or excessive timidity, but it was not confiding.

FIG. 1. First-winter male Yellow Warbler *Dendroica petechia*, Bardsey Island, Caernarvonshire, 29th-30th August 1964 (*photo: H. Miles*)

At first I was of the opinion that it was probably a xanthistic variant (see *Brit. Birds*, 53: plate 44; and *Bird Notes*, 26: plate xxx), but it was soon judged not to be an aberrant Willow Warbler, for, whilst approximating very closely in size, it lacked the slender lines typical of that species and was more compactly built with a relatively shorter neck and tail, rounder head and distinctly heavier bill. It succeeded in evading the net on several occasions, but was eventually caught at 18.20 hours GMT. Once it was in the hand, even a cursory examination of the remiges precluded the possibility of its being any Old World species (see *Brit. Birds*, 57: 252 and *Fair Isle Bird Obs. Bull.*, no. 4 (1951): 29-30). Its weight was 9.0 grams. Whilst photographs were being taken (fig. 1), it was also seen in the hand by Dr. P. M. Driver, R. C. Pratt and all visitors staying at the observatory. Lighting conditions in the laboratory were by this time such that a thorough examination could not be entertained; it seemed likely that our bird might be an American Yellow Warbler *Dendroica petechia*, but the only reference work available, L. A. Hausman's *Field Book of Eastern Birds* (1946), proved inadequate for our purpose. It was therefore decided to keep the bird overnight. Unfortunately, soon after dawn on the 30th, it died in the hand; there had been an overnight weight loss of exactly one gram. The following description was taken by H.M., R.F.D. and myself:

Upper-parts: forehead and crown bright yellow, tinged green; hind neck, mantle and scapulars bright greenish-yellow; back, rump and upper tail-coverts bright yellow with faint greenish tint; loral region vivid yellow. *Under-parts:* chin, throat, breast, belly, flanks, vent and under tail-coverts uniform vivid yellow, breast feathers faintly streaked reddish-brown forming

indistinct gorget. *Wings:* primaries and secondaries dark brown, outer webs narrowly edged bright yellow; 6th to 10th primaries and all secondaries tipped yellowish-white; tertials paler than primaries, particularly outer webs; primary coverts dark brown with suggestion of greyish, outer webs a shade paler; lesser, median and greater coverts all dark brown edged bright yellow, especially outer webs; bastard wing dark brown, outer web narrowly edged bright yellow; bastard wing-coverts also dark brown with wider pale yellow fringes on outer webs; under wing-coverts bright yellow; axillaries yellowish-white. *Tail:* pale brown outer and pale yellow inner webs; penultimate pair with slightly darker outer webs; central pair dark brown slightly edged pale yellow. *Soft parts:* upper mandible horn with slight purplish suffusion; lower mandible pearl, distal half rather darker; gape light pink; tarsus medium horn with suggestion of pale purplish; toes lighter and soles pale flesh; iris jet black. *Measurements:* wing 63.0 mm.; bill (from skull) 12.0 mm., depth (at nostrils) 3.5 mm., width (at nostrils) 4.0 mm., distance from centre of nostril cavity to tip of upper mandible 8.0 mm.; tarsus 20.0 mm.; tail 42.0 mm. *Wing-formula:* 4th primary longest, 3rd −0.5 mm., 2nd −1.0 mm., 5th −2.0 mm., 6th −5.5 mm., 7th −8.0 mm., 8th −9.5 mm., 9th −11.5 mm., 10th −14.0 mm.; 3rd and 4th clearly emarginated on outer webs, 5th less so; 1st minute, 7.0 mm. shorter than longest primary covert.

The skin was preserved by R.F.D. The carcass was examined and er dissected by P.M.D. following his return to the mainland. He orted on the post-mortem inspection as follows:

'This bird had no observable signs of disease or parasitic infection, d seemed generally to be in good condition. There was, however, sign of the usual fat deposits found in fall migrants—not even in the lvic and pygidial regions or in the peritoneum—which suggests that had recently exhausted its food stores. There was no obvious sign muscle wastage. There was no sign of any food remains in the gut, ough this is to be expected in a small passerine after a night's rest m feeding. Features of interest concerning the viscera were well-veloped gizzard and kidneys, and apparently normal liver and pan-as. The gut was approximately 12 cm. in length. With the aid of 10 lens a small pair of testes was obvious, in addition to the more fuse and somewhat larger adrenal glands. The size of the testes ggests that the specimen was a bird of the year, rather than a breeding d with post-breeding regressed sex organs. These immature male racteristics would seem to be borne out by the plumage features. e condition of the bird would seem to support a supposition that had reached this country by means of an "assisted passage". In the d and in the hand, it was quite active, suggesting, with the post-rtem conclusions, a healthy state. Yet there were no food stores. h might well be the case with a bird which had crossed much of the antic on board ship with a limited amount of insect food, and had ently arrived here—so recently that it had not been able to re-stock food stores.'

On 3rd September 1964, R.F.D. conveyed the skin to the British

Museum (Natural History) where Derek Goodwin had no hesitation in confirming the identification as *Dendroica petechia*. The species has a variety of races in America and a decision on the subspecies involved proved impossible. It was deemed to be in first-winter plumage.

In conclusion, some remarks are warranted concerning the part played by the weather in this event. The report by P.M.D., though favouring the idea of assisted passage, certainly does not exclude the possibility that this mite crossed the Atlantic unaided except by the wind. *If* its first point of landfall was Bardsey, however, its weight on arrival would tend to suggest that perhaps it did not cross without some form of assistance and that it succeeded in obtaining meagre sustenance *en route*. It is very doubtful if it was on the island before the day on which it was first seen and caught. Furthermore, an examination of the Daily Weather Report covering the week prior to 29th August does not show weather situations likely to permit a bird of this size optimum conditions for drifting non-stop from America. On the day of its appearance on Bardsey an anticyclone was centred to the west of Ireland and a light north-westerly airstream affected all parts of Britain.

[The Yellow Warbler is one of the most familiar warblers in America. It is also one of the most widespread, ranging from northern Alaska to western Peru, and it may therefore seem surprising that the species has never before been recorded in the British Isles, or indeed in Europe, with the possible exception of an old undated specimen said to have been obtained in Axwell Park, Co. Durham, in May 1904 (see W. B. Alexander and R. S. R. Fitter, 'American land birds in western Europe', *Brit. Birds,* 48: 1-14). It should be noted, however, that it is normally a very early autumn migrant. A. C. Bent (1953, *Life Histories of North American Wood Warblers:* 160-195), commenting particularly on this, stated that the southward migration begins as soon as the young are able to take care of themselves, with the result that autumn passage is at its peak from mid-July to the beginning of September and that there are then only stragglers until early October. Probably, therefore, most of the population is too far south before the onset of the weather conditions which produce the biggest numbers of American birds over here in September and October. In this connection, it should be noted that the Bardsey date is earlier than those of other American passerines recorded in western Europe (see Dr. I. C. T. Nisbet, 'American passerines in western Europe, 1951-62', *Brit. Birds,* 56: 204-217).

A. C. Bent gives the breeding range of the Yellow Warbler as extending north to northern Alaska, Yukon and Mackenzie and to central Quebec and Labrador, and then south throughout Canada and the United States to central Georgia, parts of Texas and northern Baja

alifornia, thus covering 40° of latitude. It winters from southern aja California and central and south Mexico south to northern Brazil nd central Peru. The extreme points of its range are thus further parated than those of any other American warbler.

This is the only American warbler which is all yellow. Others are llow below, but none is so yellow on the back, wings and tail; with e exception of the female American Redstart *Setophaga ruticilla*, this also the only American warbler with yellow edges to the tail feathers. dult males have chestnut-red streaks on the breast, but these are faint lacking in females and immatures. On the question of weight, we ave not been able to find many published references to the weights of tumn migrants, but, for example, an immature in Massachusetts/ onnecticut on 21st August weighed 9.8 grams (see Mrs. K. B. Wether-ee, 1934, 'Some measurements and weights of live birds', *Bird-nding*, 5: 55-69).—EDS.]

Studies of less familiar birds

137. Woodchat Shrike

Photographs by M. D. England and Eric Hosking

(Plates 68-71)

HE WOODCHAT SHRIKE *Lanius senator* has a rather limited distribu-on in western Europe, north-west Africa, Asia Minor and the Near ast. Its strongholds in Europe are Iberia, France, Italy, the Mediter-nean islands and some parts of the western Balkans down to northern reece. It is rather scarcer and more local in Switzerland, Germany, st Belgium and the eastern Netherlands east to Poland, Czecho-ovakia, Hungary and Bulgaria. The species is also rather thinly stributed in many parts of its eastern range from Turkey and the Near ast through Iraq to Iran and Baluchistan. It is therefore primarily a rd of the extreme south-west Palearctic, which winters in tropical frica south of the Sahara but north of the Equator from Senegal to omaliland.

This shrike has occurred as a rare vagrant as far north as Sweden and nland, but to Britain and Ireland it is now a more regular straggler. ne first one recorded here was mentioned by Gilbert White in 1769, ut by 1938, when *The Handbook* was published, there were still only out fifty records. The species remained very infrequent up to the id-1950's when, however, it began to appear regularly and in the ree years 1958-60 there were no less than 53 records. In the next

three years, 1961-63, there were only ten and it seemed that there had been a reversal of whatever factors had accounted for the previous increase, but then there were nine in 1964 and probably at least an equal number in 1965. Of the 72 recorded in Britain and Ireland during the seven years 1958-64, three were in April, 24 in May, 11 in June, one in July, 19 in August, 12 in September and two in October; the majority of those in autumn have been young ones. Incidentally, the species is supposed to have nested near Freshwater, Isle of Wight, in 1856 (J. E. Kesall and P. W. Munn, 1905, *The Birds of Hampshire and the Isle of Wight*: 51-52), one clutch of eggs being taken and a youngster obtained from the second attempt.

The caption to plate 68 draws attention to the main plumage characters of this species, of which there are three or four separate races. One of the features which varies most between populations is the white wing-bar: this is completely absent in the form found in the Mediterranean islands and otherwise increases in size from west to east on a clinal basis to such an extent that in the extreme east of the range it averages half as wide again as in the west.

This shrike is largely a tree nester which favours smaller and more scattered trees (and tall bushes) than does the Lesser Grey Shrike *L. minor*. It is also very much a bird of olive groves, orchards and gardens, as well as wood edges. In south-west Europe, along with the Corn Bunting *Emberiza calandra* and Stonechat *Saxicola torquata*, it is one of the most common roadside birds, perching on bushes, small trees and telegraph wires. From such conspicuous vantage points its gleaming white breast makes it stand out as it watches for passing prey, often turning its head on one side and moving its tail slowly up and down or from side to side.

Plates 69 and 70 demonstrate once again the value of the camera as a means of identifying food brought to the nest. I am most grateful to G. Gradwell of the Hope Department of Entomology, Oxford, for determining that the prey in each of these three cases is a long-horned grasshopper (Tettigoniidae). Grasshoppers are perhaps the most frequent food of the Woodchat Shrike, particularly when feeding young, but caterpillars and grubs were also brought to this particular nest and the species will take such varied items as worms, horse-flies, beetles and small birds and mammals.

The nest, which is most frequently between five and fifteen feet above the ground, is usually built near the end of a branch of a tree with dense foliage or in the crown of a smaller sapling. It is typically softer and greener-looking than those of other shrikes because it is largely composed of flowering weeds, particularly cudweed *Gnaphalium*, which the bird pulls up from the ground. Sometimes the entire nest, lining and all, is made in this way, but in other cases roots and small twigs

may be used as well and the lining may include a variety of materials (see plate 69). The four to six eggs are said to hatch in about 16 days and the young then spend nearly three weeks in the nest.

Plate 71b shows a juvenile Woodchat and draws attention to the features which distinguish it from the rather similar young Red-backed Shrike *L. collurio*. This bird, which was about ten weeks old when this photograph was taken, is one of two which M. D. England brought back to this country and hand-reared after the nest concerned (not the one in the photographs) had been found on the ground beneath a cork oak in central Portugal on 1st June 1965, following a night of heavy gales. Mr. England has contributed the following notes on the development of these young ones:

"From the beginning they differed both in character and appearance, one being larger, bolder and darker on the forehead and crown than the other. On these slender grounds they were taken to be of different sexes and their subsequent behaviour has tended to confirm this (though it may be that one is much slower in maturing). The larger and darker one takes the lead in everything from feeding and bathing to "swearing" at anything strange. This one also sings continuously, having started on 20th June when it was about a month old, whereas the pale-headed one has only twice been heard to sing and then rather feebly. Although the latter can feed "herself" perfectly well, she habitually begs for food from "him", sometimes successfully; if he is not carrying food at the time, he will false-feed her by thrusting his bill into her open gape. This does not prevent them from having many tugs of war with insects, leaves or twigs and both habitually stick food and other objects into crevices. A favourite spot for hiding things is the metal grating over their heater, into which they both, but especially the "male", regularly poke excess mealworms; he also spends long periods threading twigs through the holes. They brought up pellets of insect remains while still nestlings and their feeding habits now make them appear true birds of prey in miniature. They "mantle" over their food and then fly with it to a perch where they grasp it in the toes of one foot, either holding it on the perch or lifting it to nibble at it. In addition to raw meat and insects of all kinds, they tear at the foliage in their aviary and, although most is eventually dropped, they swallow a considerable amount.'

The above account is of interest in pointing out possible sexual differences in the behaviour and plumage of young Woodchats and in recording the onset of singing and of the courtship-feeding which is very much a feature of this genus (plate 71a). It also draws attention to something which is unusual among passerines—the use of the feet in handling prey, which Dr. H. Mester likewise recently referred to in his paper on the Great Grey Shrike *L. excubitor* (*Brit. Birds*, 58: 375-383).

Dr. Mester also described positive and negative reactions by other birds to Great Grey Shrikes and, in this connection, Dr. G. Beven tells me that he has seen Tree Sparrows *Passer montanus* and Swallows *Hirundo rustica* fly away when a Woodchat landed among them and he has also watched a Woodchat being mobbed by Spotted Flycatchers *Muscicapa striata*. Certainly many small birds seem to object to the presence of this species. I. J. FERGUSON-LEES

Palearctic birds

Special Review by K. H. Voous

The Birds of the Palearctic Fauna: a Systematic Reference (Non-Passeriformes). By Charles Vaurie. Witherby, London, 1965. xxii+764 pages. £7 7s.

ALTHOUGH THE PALEARCTIC unites such seemingly diverse areas as Britain, the Mediterranean countries, Siberia and Japan in one zoogeographical entity, the avifaunas of all parts of this huge Old World region have so much in common that any European ornithologist is always able to find his way far more easily among the birds of, for example, Japan than those of, say, West Africa. A survey of the whole Palearctic avifauna, including recent information from such relatively little known countries as Iran and China, is therefore of great value to ornithologists throughout Europe and the vast area of temperate Asia. Such a survey is the far-reaching purpose of the present book, written by so able a systematist as Charles Vaurie, curator of ornithology at the American Museum of Natural History. It is, in fact, the second volume of this important work. The first volume, published in 1959 and reviewed by Kenneth Williamson in this journal in 1960 (*Brit. Birds*, 53: 233-236), dealt with the Passeriformes. This companion volume therefore completes what may be regarded as a modern revision of Ernst Hartert's great *Die Vögel der Paläarktischen Fauna* (1903-38).

The Birds of the Palearctic Fauna is a systematic list of all the bird species breeding in the Palearctic, together with a review of their geographical races or subspecies. The present volume, the basis for which was laid by twenty issues (nos. 34-53) of Dr. Vaurie's 'Systematic Notes on Palearctic Birds' in *American Museum Novitates* between 1958 and 1963, covers 559 species. Others which occur regularly, or even occasionally, but which actually belong to some other faunal region of the world, are listed by name in separate notes at the end of each family, as are species which breed just outside the southern border of

ATE 68. Female Woodchat Shrike *Lanius senator*, Portugal, May 1964: a duller
ersion of the male with less rufous cap bordered by black frontal band, blackish
ings with white scapulars and wing-bar, and pure white under-parts which attract
tention at long range; the rump is also white (pages 461-464) (*photo: M. D. England*)

PLATE 71. Above, male Woodchat Shrike *Lanius senator* feeding female at nest, Spain, May 1957 (*photo: Eric Hosking*). Below, juvenile ten weeks old: paler and greyer than young Red-backed *L. collurio*, with a larger head, more scaly crescentic markings, and pale scapulars, wing-bar and rump (page 463) (*photo: M. D. England*)

the Palearctic, such as the Marabou *Leptoptilos crumeniferus* and the Nubian Bustard *Neotis nuba*.

The scope, treatment and typography are of the same high standard as in the first volume, but there are some slight differences which, although they are only matters of degree, make the present volume even more excellent. For example, the treatment is less drastic and there are not so many clean sweeps of traditional races and generic names (or have we become accustomed to this habit?); as a result, the whole work is more balanced. At the same time, the fruits of Dr. Vaurie's contacts with Russian ornithologists are even more apparent, and the distribution of each species is also given in greater detail. On the other hand, the habitat sections have not been similarly expanded and are therefore not always satisfactory. For instance, the description of the habitat of the Tufted Duck *Aythya fuligula* as 'similar to that of *A. ferina* or *A. nyroca*, but more common on the sea coast' does not give credit to observed differences in the preferences of these species.

A systematic reference such as this deals with three major subjects—systematics, nomenclature and distribution—which I propose to discuss separately as I consider them independent disciplines.

Systematics

(*a*) *Sequence*. The sequence of orders and families is more or less that of the Wetmore system, starting with the Struthioniformes (ostriches) and Gaviiformes (divers) and concluding with the Piciformes (wrynecks, piculets and woodpeckers). However, there are a number of deviations for which no reasons appear to be given. As the scientific significance of such alterations in a linear sequence is nil, any new sequence is unnecessarily impractical. For instance, the sequences of families within the Pelecaniformes (frigate-birds, pelicans, gannets, cormorants and darters), Ciconiiformes (herons, ibises and storks), Gruiformes (cranes, bustards, rails and button-quails) and Coraciiformes (rollers, kingfishers, bee-eaters and hoopoes) are drastically different from those published in Alexander Wetmore's most recent classification (*Smiths. Misc. Coll.*, 139 (11): 1-37). In addition, some groups treated by Wetmore as families have been reduced to subfamilial rank, but this is of small scientific importance and has few unfortunate repercussions; examples are the Tetraoninae (grouse), Numidinae (guineafowl), Scolopacinae (snipe and sandpipers), Recurvirostrinae (avocets and stilts), Phalaropodinae (phalaropes), Stercorariinae (skuas) and Tytoninae (barn owls).

(*b*) *Genera*. The delimitation of genera is being given much attention nowadays and has provoked numerous controversial publications in almost all fields of zoology, though in few of these papers have real scientific problems been involved. Fortunately for the stability of our

ornithological nomenclature and, for that matter, for the practical use of binomials, Dr. Vaurie has been very cautious in steering between the Scylla of over-lumping and the Charybdis of over-splitting. I was delighted to note the maintenance of such genus names as *Pterodroma* (not lumped with *Bulweria*), *Puffinus* (not with *Procellaria*), *Bubulcus* (not with *Ardeola*), *Egretta* (not with *Ardea*), *Hieraaëtus* (not with *Aquila*), *Eudromias* (not with *Charadrius*) and *Ketupa* (not with *Bubo*), to mention just a few. On the other hand, I can appreciate the lumping of the odd genus *Xema* (Sabine's Gull) with *Larus*. No two authors would agree completely in the handling of genera and this is not so much to be deplored as the people who compile check-lists would seem to think. It is a measure of the freedom of personal scientific interpretation. Even so, I do not understand (and no reasons are given) why the Grey-rumped Sandpiper and Wandering Tatler have been included in the genus *Tringa* (as *T. brevipes* and *T. incana*) while the Terek Sandpiper has been left out (as *Xenus cinereus*). Surely all or none should be in *Tringa*.

(*c*) *Species*. The species concept as handled by Dr. Vaurie is neither noteworthily 'narrow' nor particularly 'broad'. I have repeatedly stated elsewhere my preference for a moderately conservative treatment in reference lists of this kind and Dr. Vaurie seems to have been only slightly more progressive than that. Nevertheless, his rather narrow species concept in such cases as the Black-throated Diver (divided into *Gavia arctica* and *G. pacifica*), Peregrine (divided into *Falco peregrinus* and *F. pelegrinoides*) and Tatler (divided into *Tringa incana* and *T. brevipes*) does not seem to be indisputably substantiated at present. Again, the sequence of species within a genus is often a most controversial subject. Fortunately, however, Dr. Vaurie has followed J. L. Peters's *Check-List of Birds of the World* for the most part, though there are some notable exceptions.

(*d*) *Subspecies*. Dr. Vaurie gives considerable attention to the subject of geographical variation and, hence, to the recognition of subspecies. The pattern of variation is usually discussed separately, before the actual list of races, and this is a most fortunate treatment. Regular clinal variation is a big challenge to the practical use of subspecific names and it is probable that no two authors would favour the same solution in every case, but, on the whole, Dr. Vaurie's use of subspecific names will probably satisfy the majority of taxonomists. Nevertheless, the suppression of any named subspecies in the cases of the Gyr Falcon *Falco rusticolus* and Little Bustard *Otis tetrax* came as a surprise to me. Dr. Vaurie's rejection of numerous 'traditional' races is usually well founded. However, his recognition of *Falco peregrinus calidus* as the Old World arctic form of the Peregrine—a race which is hardly, if at all, separable by plumage characters or measurements, but

which is characterised by migration habits—will probably not be favoured by many of those who know the intricate problems of geographical variation in this species, particularly as Dr. Vaurie has simultaneously rejected other races of equally doubtful status.

Nomenclature

Throughout this work, as was to be expected, the nomenclature almost completely conforms to the present *International Code of Zoological Nomenclature* (1961). Dr. Vaurie even follows the decision of the International Commission on Zoological Nomenclature to use the generic name *Gallinago* Brisson for snipe, although this is deplored by not a few zoologists. However, according to articles 27 and 32(c) of the *International Code,* the diareses and hyphens in such names as *Hieraaëtus* and *Hirund-apus* should have been deleted, making these *Hieraaetus* and *Hirundapus* respectively. At the same time, if the rules of priority are adhered to, the family name Threskiornithidae (spoonbills and ibises) should have been replaced by Plataleidae (see P. Brodkorb, 1963, *Bull. Florida State Mus., Biol. Ser.,* 7 (4): 277).

Nomenclatural confusion still reigns over the name for the Caspian Tern. This is *Hydroprogne caspia* (Pallas, 1770) in the North American and British check-lists and throughout much of the European literature, but Dr. Vaurie has opted for *H. tschegrava* (Lepechin, 1770) and gives reasons for doing so. A decision on this matter by the International Commission on Zoological Nomenclature seems very desirable.

Distribution

The geographical distribution of each species and subspecies is carefully outlined and Dr. Vaurie has succeeded in keeping it remarkably up-to-date. Ensuring that such information is completely up-to-date is very difficult, however, as I have found myself, and a minute search through the text will inevitably reveal such minor omissions as the sensational breeding of the Bee-eater *Merops apiaster* in Sussex in 1955 (though the attempted nesting near Edinburgh in 1920 is referred to).

Comparison with other check-lists

Dr. Vaurie's work compares most favourably with the *Check-list of the Birds of Great Britain and Ireland* (1952) and the *Check-list of North American Birds* (1957). Compared with the British check-list, there is a more balanced use of generic names and much greater common sense over matters of nomenclature. The unfounded wide use of *Procellaria, Bulweria* and *Charadrius* has largely been abandoned though I deplore Dr. Vaurie's continued use of *Procellaria,* instead of *Puffinus,* for the Atlantic or Cory's Shearwater *P. diomedea* and the White-faced

Shearwater *P. leucomelas*; these birds seem to have little in common with the Cape Hen *Procellaria aequinoctialis* which is the type species of Linnaeus's name *Procellaria*. The treatment of the Red Grouse as *Lagopus lagopus scoticus*—in other words, as conspecific with the circumpolar Willow Grouse—is another improvement over the British check-list. Similarly, the North American check-list's restricted use of generic and specific names has not been continued by Dr. Vaurie. For example, *Olor cygnus* (for the Whooper Swan) is replaced by the more widely accepted and understandable *Cygnus cygnus*, *Chen hyperborea* (Snow Goose) by *Anser hyperboreus*, *Anas carolinensis* (Green-winged Teal) by *Anas crecca carolinensis*, *Mareca penelope* (Wigeon) by *Anas penelope, Squatarola squatarola* (Grey Plover) by *Pluvialis squatarola*, *Erolia alpina* (Dunlin) by *Calidris alpina*, *Crocethia alba* (Sanderling) by *Calidris alba*, *Himantopus mexicanus* (Black-necked Stilt) by *Himantopus himantopus mexicanus* and *Lobipes lobatus* (Red-necked Phalarope) by *Phalaropus lobatus*.

All in all, *The Birds of the Palearctic Fauna* is a very fine and most indispensable work which does not attempt to settle or 'freeze' the still numerous systematic problems affecting the avifauna of this region. The author deserves much appreciation and congratulation for his many wise and moderate decisions.

Notes

Association between Little Egret and African Spoonbill.—There are a number of records of one species attending another to feed on the insects and other small animals it disturbs. Such associations may be regular—for example, that of the Cattle Egret *Ardeola ibis* with large mammals—or they may represent an individual capacity to take advantage of a temporary favourable situation. The following incident was probably an example of the latter.

On 15th August 1963 I was in a hide at the edge of a reservoir near Tabora in Tanzania when I noticed that a Little Egret *Egretta garzetta* was deliberately feeding in close proximity to an African Spoonbill *Platalea alba*. This species has very similar habits to the Eurasian Spoonbill *P. leucorodia*, striding vigorously through the water while sweeping its bill from side to side. The egret kept close to, and a little behind, the spoonbill, catching prey disturbed by the latter's movements. Eventually the spoonbill stopped feeding and went to sleep. While it was asleep the egret moved some distance away, but when the spoonbill started feeding again the egret at once flew back to resume the association. JOHN REYNOLDS

Kestrels feeding on carrion.—At about 5.30 p.m. on 13th February 1965, near the top of Hightae Drum just outside Castle Douglas, Kirkcudbrightshire, we watched a female Kestrel *Falco tinnunculus* feeding on a dead goose. Under cover of the hillside we were able to approach to within about fifty yards before the Kestrel flew off. The carcase was that of a Grey Lag Goose *Anser anser* which appeared to have been dead two to three weeks. Feathers were scattered round the corpse, the breast muscles had been removed and the sternum was exposed, but this had evidently been done much earlier, perhaps by Carrion Crows *Corvus corone*, for the bare flesh was blackened and partly dehydrated. The Kestrel had clearly been picking at part of a wing muscle which, in contrast, was still red and moist.

When we first saw the Kestrel from a distance of 500-600 yards, she was pecking rather rapidly at the carcase and it might have been thought that she was feeding on invertebrate animals concentrated there, but careful examination (during which we removed a wing) did not reveal any such alternative prey and we had no doubt that she was taking carrion. The weather was mild and, apart from a brief spell of frost a few days previously, had been so for some time.

A. A. Bell, J. D. Craggs, M. J. Donahue
and R. J. H. Raines

[Dr. J. S. Ash, who with Derek Goodwin and Dr. N. Tinbergen is a member of the advisory panel which helps us to consider notes submitted for publication, has contributed the following comment on this record.—Eds.]

Although *The Handbook* states that 'exceptionally dead mammals or birds' are eaten by Kestrels, this species actually takes such carrion quite commonly and I have many notes to this effect. It is a habit that used to be exploited by those gamekeepers who made a point of placing a trap beside any dead bird they found. Two examples selected at random from my notes are as follows.

On 18th February 1952 a Kestrel was flushed from the ground in a field at Damerham, Hampshire. It attempted to carry off the remains of a half-eaten Partridge *Perdix perdix* which had evidently been killed by either a Peregrine *Falco peregrinus* or a Hen Harrier *Circus cyaneus*. A trap placed to this corpse by the local keeper caught an adult male Kestrel the same day and an adult female the next day (this was during a study of a Partridge population under normal gamekeeping conditions and these and other hawks caught were later released elsewhere).

On 5th March 1952, in the same part of Hampshire, I disturbed a female Kestrel from a dead Partridge from which she had just begun to feed. The Partridge had probably died during the preceding night and it was obvious that it had not met a violent end, for its feet were

drawn up in the manner characteristic of birds dying a lingering death, as from certain diseases. In fact, pathological examination revealed that it had died of entero-hepatitis.

In neither of the above cases was there any sign of invertebrates upon which the Kestrels might have been feeding. J. S. Ash

Guillemots nesting in deep cavity.—On 16th April 1965 we were sitting on top of a natural arch forty or fifty feet above the sea at Pointanbullig, Cape Clear Island, Co. Cork, when we heard the groaning of Guillemots *Uria aalge*. Looking down a crack some three inches wide and ten feet from the edge of the cliff, we saw a Guillemot in a chamber about ten feet down; also inside the chamber were four eggs (two of them broken) which, in view of the date, clearly remained from the previous season. We climbed round until able to see the side of the arch in which we expected the entrance to the cavern would be. In the centre of the sheer face was a crack no more than a foot wide and from this six Guillemots emerged during the next half hour, after which the cavity appeared to be empty.

This species almost always nests on open ledges (Fisher and Lockley 1954, Kartaschew 1960, Kozlova 1961, Tuck 1960) and we know of only one other record of hole-nesting, involving an entire colony of about 80 pairs on Bleiksoya, off Andoya, Norway (Jenkins 1953). The reason why some of the Guillemots had moved out of their usual breeding niche on Cape Clear is presumed to be the lack of more normal sites. At Pointanbullig the rock is pitched at some 60° to the horizontal, so that suitable nesting ledges are non-existent, and the rest of the island is very similar. This no doubt accounts for the low population of Guillemots there: P. A. Wright found only 141 breeding pairs on the island in 1963 (Sharrock 1964). Jenkins advanced a similar explanation for the hole-nesting habits of his Norwegian colony.

Adaptive radiation has produced a wide range of nest-sites in the auk family. The Cape Clear and Bleiksoya Guillemots appear to show that this evolution may well have been facilitated by a plasticity of choice when the usual type of breeding site is scarce.

Susan Fogden and Jeremy Greenwood

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Death of Swift by drowning.—On 7th June 1965 a number of Swifts *Apus apus* were flying to and fro over Staines Reservoir, Middlesex, and in the prevailing calm air many were keeping very close to the mirror-smooth water. Suddenly one checked in flight and spun round through about 120°, one of its wings having apparently touched the surface. Then, with its body in a head-up and tail-down position, it stalled and dropped into the water six inches to a foot below.

For a few seconds it floated buoyantly before trying to take off again. At its first attempt it managed to rise several inches clear of the surface but, failing to gain momentum, fell back. Almost at once it tried again with the same result and this was repeated for between two and three minutes with gradually lessening success. After this it was unable to lift its wings out of the water before beginning the downstroke: this stage lasted for between five and six minutes during which the action changed from one of hopping or jumping forward to that of crawling over the water. Then there were only bobbing movements of the body at lengthening intervals and after a total of about thirteen minutes only faint motions sufficient to rotate it slightly, the last of these occurring some five minutes later.

I continued watching it for some time, but it now appeared to be lifeless—a small, dark object clearly visible as it floated on the water. It was still there after twenty-five minutes, but looking back as I left the reservoir shortly afterwards, I found that it had disappeared. Two Lesser Black-backed Gulls *Larus fuscus* were swimming in the area where it had been, one of them with neck upstretched as though looking for food.

Dr. David Lack, in *Swifts in a Tower* (1956), referred to Swifts bathing and stated that Swiss observers had seen them 'descending in a fast glide to the river Aar and submerging themselves almost completely before rising again with vigorous shakes of the body to remove water'. He also mentioned that 'large gatherings over water may consist chiefly of non-breeding birds, especially yearlings, though this is not proven'. The incident I have described was obviously accidental and may perhaps have involved an inexperienced year-old bird.

C. M. VEYSEY

Reviews

The Broads. By E. A. Ellis. Collins, London, 1965. 401 pages; 77 monochrome photographs and 68 maps and diagrams. 36s.
This long-awaited guide to the natural history of the Norfolk broads is most impressive. Edward Ellis's writing is always colourful and he

brings the broadland scene vividly before us. There are chapters on the early geology of broadland, on the physiographical evolution of the east Norfolk river valleys since the Ice Age, and on the vegetation, the invertebrate animals, the fishes, the amphibians and reptiles, the birds and the mammals. But this is not only a book for naturalists. There is also much of general interest. The chapters on the origin of the broads, on man in broadland and on native river craft, for example, make fascinating reading. In addition to a full bibliography, there are valuable appendices giving maps of every broad during the last century and notes on broadland marsh tools and broads insects.

The chapter on birds occupies 19 pages, all except five being devoted to 'brief descriptions of the local status of most of the birds known to frequent the broads'. It was compiled by the late B. B. Rivière, who died in 1953, and Edward Ellis. This section valuably condenses a surprising amount of information, but there are points on which one might quibble. For example, Cormorants are no longer 'fairly regular in small numbers' as over a hundred spend each winter at Ranworth; Shelduck are not now rare, breeding having taken place at Hickling and other places; White-fronted Geese are, in fact, decreasing; the Bewick's and not the Whooper is now the more abundant wild swan; and the Ringed Plover has nested on the wader grounds at Hickling. Missing from the list are the Brent Goose, appearing most winters at Breydon; the Oystercatcher, nesting each year at Breydon and Horsey; the Little Stint, Curlew Sandpiper and Wheatear, all regular passage migrants; the Stonechat, nesting at Horsey; the Redstart and Pied Flycatcher, both regular in autumn near the coast; and the Twite, Lapland Bunting and Snow Bunting, all wintering on the Breydon saltings.

The illustrations are varied and all of a high standard.

MICHAEL J. SEAGO

Water Birds with Webbed Feet. By Paul Geroudet, translated for the English edition by Phyllis Barclay-Smith. Illustrated by Robert Hainard. Blandford Press, London, 1965. 314 pages; 24 colour plates; 24 photographs; 59 line-drawings. £2 2s.
Les Palmipèdes, of which this is a revised translation, was published originally in Switzerland in 1959. As the title implies, it is a somewhat specialised book, comprising in effect an introduction to the European species of the Natatores, the 19th century Order which grouped together the divers and grebes, the petrels, cormorants and pelicans, the swans, geese and ducks, and the auks, skuas, gulls and terns. Because of its several anomalies this particular grouping has long been obsolete, and the author was perhaps unwise to adhere to it as rigidly as he has. By doing so he has surely detracted from the value of the book

as a work of reference, especially in the field, where the characteristic of the webbed foot is seldom apparent.

Nevertheless, he has contrived to bring together a great deal of information in a concise and readable form. For each species there is a brief description of the plumage and measurements, status and distribution, and of the breeding biology, recapitulated from the standard works. Reference is also made to selected papers in the leading European journals. Added to this is a popular and more discursive account, including details of behaviour, appearance, voice, food, habitat and migration. It is these essays which give the book character and reflect the author's zest for his subject.

The illustrations add further sparkle, although the colour plates are often less successful than the many vignettes in line and charcoal. The photographs are well reproduced, and have been selected with care from a wide range of sources.

The standard of translation is beyond reproach, but, paradoxically, its very excellence may lead to misunderstandings. The book is so palpably English in format and idiom that it is sometimes difficult to remember that the emphasis lies not on the British Isles but on the situation in Switzerland, France and Belgium. As a result, a number of remarks appear misleading at first sight. There is, for example, no mention of the White-fronted Goose occurring in Britain; the Barnacle Goose is said to winter 'in a somewhat restricted area, mainly in the Netherlands' (again no mention of Britain); and the Grey Lag 'does not occur in large flocks in Western Europe'. Such ambiguities are often heightened by the more detailed accounts of breeding distribution which precede them, and by the fuller treatment accorded to some species.

Despite this, the book has much to recommend it. Most of the species dealt with are migratory, and many are threatened by loss of habitat and other human pressures. A knowledge of their status abroad is therefore essential to a proper understanding of their requirements in Britain. With Mr. Géroudet's observations to hand the reader will have less excuse for insularity.

G. L. Atkinson-Willes

Letters

The problems of separating Reed and Marsh Warblers

Sirs,—Having read with considerable interest the recent letters on the problems of separating Reed Warblers *Acrocephalus scirpaceus* and Marsh Warblers *A. palustris* (*Brit. Birds,* 58: 181-188), I hope that the

following comments may be of some assistance. My first-hand experience of Marsh Warblers extends over some fourteen consecutive seasons and during this period I have made frequent and continuous observations and found some twenty nests; most of my watching has been done in Worcestershire, but some also in Gloucestershire and on the Herefordshire/Worcestershire border.

Song

In the area where most of my observations have been made there is also quite a considerable population of Reed Warblers which often breed in the osier beds but more frequently in the narrow reed edges to the streams near-by. There is, therefore, a considerable overlap of habitat. Nevertheless, only on three occasions have I come across Reed Warbler mimics which could be mistaken for Marsh Warblers, and each of those only for a short time before the rhythm mentioned in C. M. Swaine's letter inevitably came to the fore. Once Marsh Warbler song is *well known* there can be no confusion. The explosive character reminiscent of a Nightingale *Luscinia megarhynchos* (at times even almost of a Cetti's Warbler *Cettia cetti*) and the *chichichichichi* undertone, which is much softer and quieter than the similar note of the Sedge Warbler *A. schoenobaenus*, are unmistakable. Another very characteristic note is *cheweeo* like that of a Canary *Serinus canarius*. Delivery of the song, although variable, is generally fast (frequently very fast) and erratic. Very often, though, only short bursts are heard from the centre of a bush and at such times the Canary note is the best characteristic. I have not noticed much resemblance to the song of Blackcap *Sylvia atricapilla* which C. M. Swaine mentioned in his letter, but would otherwise agree with all the comments he made. In full voice the Marsh Warbler is a most delightful songster which, in my opinion, can compete with any British breeding species in power, tone and delivery and which is superior to all others as a mimic.

Field-characters

I think that the greenish tinge to the upper-parts of the Marsh Warbler, mentioned in Peter Davis's letter, must be more noticeable in the hand as it is not at all easy to see in the field except in very favourable conditions. However, *once known*, the colour of the upper-parts is unmistakable, being paler than that of the Reed Warbler; in the case of the adult, this is earth-brown with no trace of rufous. The throat is also more contrasted, being just off-white while the remainder of the under-parts are a warm yellowish-buff (the under-parts of the Reed Warbler appear much colder to me). The best points when only a snap view is obtained are a very characteristic 'jowled' look and belly-down appearance and a 'jizz' much more like that of a heavy White-

throat *Sylvia communis* than anything else (the Reed Warbler looks much sleeker and not 'jowled'). Another point to watch for is the flight, which is heavy and rather moth-like, particularly when the bird is entering herbage, and which is more like that of a Barred Warbler *S. nisoria* than of any other warbler I have seen; this applies equally to juveniles and for this reason alone they can very often be recognised (even when in Reed Warbler habitats) before absolute confirmation is obtained by a sight of the adults.

The only experience I have had with juveniles has been up to the age of about six weeks on the breeding grounds. At this time they are generally darker than adults on the upper-parts and there is a slight tendency to rustiness on the rump and upper tail-coverts, although this does not seem to give the impression of as much contrast as in either young or adult Reed Warblers. However, all the juveniles I have positively identified have been accompanied by adults and if a juvenile were on its own I should be very cautious about positive identification. To complicate matters, the 'jizz' at this age is sleeker, more like that of a Reed Warbler, but with a shorter tail than the adults of either species have got.

Habitat

Where Marsh and Reed Warblers occur together, there are slight differences in the habitats occupied by each. Although Reed Warblers often nest in nettles and similar vegetation, these are normally near the reed fringes of the streams, whereas Marsh Warblers invariably require saplings, old scattered orchards or willows within ten yards of the nest (usually nearer); many otherwise suitable osier beds in Marsh Warbler areas remain unoccupied owing to a lack of growth of this kind.

Unfortunately, there has been a considerable decrease in the species in the area of observation over the past ten years, largely owing to the growing popularity of fishing and the subsequent flattening and clearing of osier beds to facilitate approach. G. M. IRESON

Sirs,—Though C. M. Swaine wisely says, in his letter (*Brit. Birds,* 58: 183-184), that it is the quality of the Marsh Warbler's song, rather than its mimicry, that is diagnostic, I think that this should be even more stressed.

Warde Fowler was, I believe, the first to find this species nesting in England. He had a very sensitive ear, and after listening to an unusually brilliant Reed Warbler's song in Oxford, and wondering if it could be a Marsh Warbler's, he went to Switzerland to hear the real thing. When he did hear it, he wrote: 'the song . . . was of an entirely

different type; instead of being a brilliant edition of the Reed Warbler's song, it never once reminded me of it.' Later in the same essay he added: 'in spite of the many imitations in which the bird indulges, there is always a very sweet individuality about the song, which makes it quite unmistakable, and should distinguish it for every reasonably acute ear from the Reed Warbler's quiet soliloquy . . .' And at the end he referred to the Marsh Warbler's 'sweet and silvery voice.'

I wholly agree with all this, and am surprised that the recent letters make no allusion to the brilliant and sensitive pioneer work of Warde Fowler; or, for that matter, of Eliot Howard.

I have been listening to Reed and Marsh Warblers (the latter in four counties) for over forty years; and though, of course, I cannot prove that I have never been mistaken (who can?), I do say that, though I have heard several unusually 'gifted' Reed Warblers, I have never yet met with one with the Marsh Warbler's peculiarly silvery quality. I would even say that a casual phrase, uttered by a Marsh Warbler not in full song, would usually be diagnostic. At one of the Tring reservoirs in Hertfordshire, one July, I heard a single phrase, consisting mainly of the call of a Pied Wagtail *Motacilla alba,* but invested with this silvery quality, and the singer had the characteristic *Sylvia*-like carriage and appearance and the colour of legs, plumage and gape of a Marsh Warbler, and I have no doubt that it was one.

I realise that some of my Marsh Warblers might have turned out to be Reed if they had been caught and critically examined. But all the same, my rather long experience of this species, unscientific and amateurish though I am, may, I hope, count for something when I repeat that I believe the quality or *timbre* of the voice is of great importance for identification. G. W. H. MOULE

Sirs,—We have read the correspondence relating to the Marsh/Reed Warbler problem with great interest, particularly in view of the fact that we have been carrying out an intensive study of *Acrocephalus* warblers since 1962.

It seems to us, having heard the mimetic Reed Warblers in the Chelmer Valley in Essex, at Tewkesbury in Gloucestershire and at Rye Meads in Hertfordshire, and having compared their songs with Marsh Warbler recordings taken at a number of sites in mid and western Europe, that there should be no confusion between the voices of these two species, and that Dr. David Lack's description (quoted by C. M. Swaine) gives the best impression of the song of the Marsh Warbler. This was borne out in a discussion with J. H. Brock on his return from Neusiedl, Austria, in 1964 when he mentioned two of the same three birds (Nightingale and Blackcap, but omitting Sedge Warbler) in his description of the song.

It is of interest that most outbreaks of mimicry are reported from habitats where there is little or none of the *Phragmites* with which Reed Warblers are traditionally associated. In these less typical habitats, Reed Warblers must come into closer contact with other species than would normally be the case, thus providing one of the obvious necessary conditions for the development of mimicry, namely that other species should be heard, preferably frequently. In our experience at Rye Meads the impression has been that outbreaks of well-developed mimicry tend to occur later in the breeding season. This may be because prolonged exposure to the song of other species increases the likelihood of the development of such mimicry. Alternatively, we would suggest that the individuals involved are late arrivals or ones that have been unsuccessful in obtaining or holding territories in preferred habitats; in either event, they would have to sing more vigorously and continuously to obtain an adequate territory alongside already well-established individuals. Such birds would seem more likely to be in their first breeding season. If this is so, they would in any case be inherently more likely to develop mimicry. There is considerable evidence that in most species mimicries are learned mainly in the first two years (E. A. Armstrong, *A Study of Bird Song*, 1963), and probably most readily in the first year. Mimicries may subsequently be lost from an individual's repertoire and lead to the disappearance of obvious mimicry from a particular site where only one or two birds have been responsible.

It is difficult to build up really convincing data to test these ideas objectively. For most of the points involved, the history of particular birds is required and one is rarely lucky or persistent enough to get adequate data on those individuals of special interest. On the question of loss of mimicry, however, we have detailed records of one ringed Reed Warbler which in 1963 had a well-used repertoire of Blue Tit *Parus caeruleus*, Swallow *Hirundo rustica* and Blackbird *Turdus merula*, but which in the two subsequent years employed only normal song.

The three characteristics mentioned earlier—apparent late arrival, vigorous mimetic song and occupation of atypical Reed Warbler habitat—have on occasion been put forward as independent pieces of evidence that an individual was a Marsh Warbler. However, in the light of what has been said above this is clearly not the case, these factors being highly interdependent. One may add also that an untidy un-Reed Warbler-like nest may be merely the consequence of use of supporting vegetation which is thoroughly unsuitable for the normal type of nest. Reed Warbler nests in hawthorn *Crataegus monogyna*, willow bushes *Salex sp.*, great hairy willow herb *Epilobium hirsutum* or nettles *Urtica dioica*, to quote some of the examples of which we have personal experience, are generally reasonably Reed Warbler-like, but

those in reed grass *Phalaris arundinacea* are rather untidy, with the appearance of 'basket handles', and depart considerably from the normal. Incidentally, this particular vegetation is very rank at Rye Meads, possibly due to the highly nitrogenous nature of the lagoon banks on which it grows, and is easily laid by wind and heavy rain with disastrous results to Reed Warbler nests built in it.

So far as plumage is concerned, we do not consider that the statement quoted in Peter Davis's letter from our paper in the *Rye Meads Annual Report for 1963* can be said to be over-cautious. Although it may be possible for observers with thorough experience of both species to distinguish adults by plumage characteristics, we cannot believe that this is true for those who are familiar only with Reed Warblers and who are going by existing descriptions available in literature. We ourselves have had no personal experience of Marsh Warblers (other than museum skins), but we have handled several hundred Reed Warblers over the last few years, many of them on a number of occasions, and have taken careful notes on a considerable proportion of these. It is our experience of the variability found in the plumage of Reed Warblers, which extends beyond the limits usually given and which overlaps the range for Marsh Warblers, that leads us to believe that it is generally dangerous to use plumage characteristics alone for field identification.

This belief is reinforced by examination of museum skins since, although a series of Reed Warblers does, as a whole, look different from a series of Marsh Warblers, an individual Reed Warbler skin can, in many cases, be matched by a Marsh Warbler one and vice versa.

Finally, we feel it is highly desirable that in discussions or statements involving stray Marsh Warblers the detailed measurements of the wing-formulae should be given. It cannot be emphasised too strongly that great care is necessary in the taking of wing-formulae and it is essential that the observers concerned should be experienced in making these measurements. JOHN CRUDASS and T. R. E. DEVLIN

Requests for information

Irruption of Waxwings.—Waxwings *Bombycilla garrulus* began to appear on the east coast of Britain about 14th October 1965, and on the 17th there were 30 on Fair Isle (Shetland). On the 19th 300 were seen at Holkham (Norfolk) and between then and the end of the month several other large concentrations were reported in East Anglia, including hundreds in the area of the Broads and 400 at Thorpeness (Suffolk). Smaller numbers arrived in many other east coast counties and by the end of the month it was clear that a large-scale irruption was taking place. The last big

invasions were in the four successive winters between 1956/57 and 1959/60 and these were analysed in a special paper by R. K. Cornwallis (*Brit. Birds,* 54: 1-30). Mr. Cornwallis is again collecting the records of the present invasion, this time in conjunction with A. D. Townsend, with a view to eventual analysis either after the present winter or at some future date if it seems likely that this is the beginning of a further series of irruptions. We should be grateful if all records could be sent to **A. D. Townsend, 11 Bassingham Crescent, Lincoln.**

Whooper Swans marked with blue dye.—In August 1965 a British expedition ringed a number of Whooper Swans *Cygnus cygnus* in Iceland. Many of these were also marked with a blue dye on the neck and, in most cases, on the front of the body and wings as well. Anyone seeing any Whooper Swans partly dyed blue is asked to send details of date and locality, as well as the number of dyed individuals and the total number of Whooper Swans present, to **A. J. Clissold, Hill House, Haydon Bridge, Northumberland.**

Birds taking dogwhelks.—C. J. Feare is studying the dogwhelk *Thais* (=*Nucella* or *Purpura*) *lapillus* and is anxious to obtain information about avian predators of this mollusc. Dogwhelks are usually found on rocky shores between mean tide level and low water. They are generally white or yellowish, but older ones may be weathered grey; when mature they have thick shells and teeth in the opercular opening. They reach a maximum size of about 30 mm. on sheltered shores, but rather less in exposed conditions and immature ones with shells of only 10 mm. are commonly found where mussels and barnacles are abundant. The only other littoral molluscs likely to be mistaken for them are periwinkles *Littorina littorea,* from which they are distinguished by their colour and size and by the presence of teeth in the mature animal. We hope that anyone who sees or has seen birds taking dogwhelks will write to **C. J. Feare, Wellcome Marine Laboratory, Robin Hood's Bay, near Whitby, Yorkshire,** with the date and locality, the species and numbers of birds, the size of the dogwhelks taken, the method of attack, and any other relevant information such as the number of dogwhelks taken in a known time.

News and comment

Edited by Raymond Cordero

More news of contamination by toxic chemicals.—*The Fifth Report of the Joint Committee of the British Trust for Ornithology and the Royal Society for the Protection of Birds on Toxic Chemicals*, published in September, shows that in the chemical analysis of 236 bodies of birds sent in to the R.S.P.B. during the year from August 1963 to July 1964 only ten were found to be completely free from the residues of organochlorine compounds and all the 47 samples of eggs (covering 145 eggs) which were analysed contained organochlorine compounds.

Analysis, which was restricted to the residues of these compounds, showed that this year the highest average residues were found in those species which feed on fish or obtain food from fresh water, such as Bitterns and Herons; and then in diurnal and nocturnal birds of prey.

The list of 84 species of birds—headed by Blackbirds, Song Thrushes and Kestrels—and 34 species of eggs contaminated came from a very wide group of habitats and

gives further support to the claim, made by the Nature Conservancy in its last annual report, that the whole environment is being contaminated by organochlorine pesticides. A series of tables showing percentages of birds contaminated in various habitats has demonstrated that the number of farmland species of birds with chemicals has tended to decrease, no doubt due to the voluntary ban on certain seed dressings, whereas the number of birds of prey, water birds, insectivorous birds, garden and woodland species with chemicals has tended to increase. In addition, the average number of compounds in each bird and the average organochlorine content have both increased.

Examples of insect contamination involved beetles, woodlice, caterpillars, worms and slugs, all of which had been taken from fields treated with one or more organochlorine compounds. The Committee asks to what extent insects and perhaps other invertebrates are becoming resistent to organochlorine pesticides.

The Committee concludes its report by stating that, whilst it welcomes the voluntary ban on certain uses of aldrin, dieldrin and heptachlor, there is still the danger of a build-up of the persistent BHC and DDT. Second, the Committee feels that the voluntary nature of these restrictions is unsatisfactory and indicates that there have been reports of stock-piling of dieldrin sheep-dips in certain parts of England and Wales. The report also calls for the compulsory surrendering of all stocks of the banned products which should be collected and kept in one place and not dumped in rivers, the sea or used on the land.

A national bird-watchers' conference.—The British Trust for Ornithology is holding a conference at the Hayes Conference Centre, Swanwick, Derbyshire, from 26th to 28th November, to which 'all bird-watchers and their friends are invited'. This national conference, which incorporates the B.T.O.'s annual general meeting and annual dinner, comprises lectures on an expedition to west Greenland, ornithology and conservation in Derbyshire, mimicry, bird identification by radar, the status of the Peregrine, the small predators enquiry, and the present position in toxic chemicals, as well as field meetings, a radar demonstration, and exhibitions, including one of modern bird paintings. All this, together with the opportunity for informal discussion with bird-watchers from all over the country, and at a total cost of only £4, makes this conference a very attractive venture. Full details are available from the Trust's secretary at Beech Grove, Tring, Hertfordshire.

Cage Birds Exhibition.—The National Exhibition of Cage Birds, to be held at Olympia, London, on 9th, 10th and 11th December, should be particularly interesting this year, as more foreign birds have been imported into Great Britain in 1965 than ever before. Some 6,000 birds, foreign and British, will be on show and the sponsors, *Cage and Aviary Birds*, promise 'some very rare and unusual species'. As usual, the exhibition should serve as a valuable reminder of the possible confusion which escapes from captivity can cause and it is likely to be an eye-opener to anyone who does not realise the extent to which many species on the British and Irish list as rare vagrants are now kept as cage birds.

R.S.P.B. bird projects for adults.—The Royal Society for the Protection of Birds, which has for some time organised interesting projects and surveys for boys and girls in its Young Ornithologists' Club, is now starting projects for its adult members. These will be aimed, not at the experienced ornithologist, but at the ordinary man or woman who has an interest in birds though not necessarily any great knowledge of them, and will deal mainly with garden birds. The first of these projects is 'Berries for Birds'—to find out which birds eat which berries.

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British Birds

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The breeding status of the Black Redstart in Great Britain

By R. S. R. Fitter

ROM 1943 TO 1949 annual reports of the Black Redstart Inquiry ppeared in *British Birds* (Fitter 1944-50). It was then decided to andon the annual attempt to obtain records direct from observers t the end of the breeding season and, instead, to rely on their publica-on in local bird reports, which now cover all the counties where the ack Redstart *Phoenicurus ochruros* has bred or held territories. Short ports for 1950 and 1951 were published in the Annual Reports of the itish Trust for Ornithology for those years, but otherwise, apart om brief details in a paper read to the XI International Ornitho-gical Congress at Basel in 1954 (Fitter 1955), none of the data presen-l here has been summarised before on a national basis.

Apart from two isolated breeding records in Co. Durham in 1845 d perhaps in Sussex in 1909, the history of the Black Redstart as a tish breeding bird began in 1923, when two pairs were found nesting hin a few miles of each other on the cliffs near Hastings, Sussex. om then until 1939 there was sporadic breeding in Sussex and Kent, l continuous periods of breeding in Cornwall and Middlesex. e 1940's saw a great increase in the number of nesting pairs which ched a peak of 41 in 1950, then fell away again to under 20 in most rs after 1953 and to as low as eleven in 1962. There seems little ıbt that the increase was much encouraged by the availability of able nesting sites and feeding grounds in the shape of bombed ldings and the associated rubbly waste, and that the decline after o was contributed to by the rebuilding of these sites, especially in the of London and at Dover, where a disproportionately large per-tage of the breeding pairs were located. This is clearly illustrated ables 1 and 2 which show the numbers of breeding pairs and singing

Table 1. Numbers of breeding pairs of Black Redstarts *Phoenicurus ochruros*, and of singing males holding territories, in the City of London and Dover from 1940 to 1963

These figures are also incorporated in those in table 2

Year	Pairs proved to have bred	Pairs not proved to have bred	Territory-holding males not known to have paired	Total territory-holding males
1940	–	–	1	1
1941	–	–	1	1
1942	1	1	9	11
1943	4	3	8	15
1944	2	–	6	8
1945	3	1	9	13
1946	8	1	6	15
1947	11	2	3	16
1948	18	2	9	29
1949	15	1	3	19
1950	25	–	2	27
1951	19	1	3	23
1952	20	2	3	25
1953	15	1	5	21
1954	10	–	8	18
1955	11	2	1	14
1956	9	–	1	10
1957	7	2	2	11
1958	6	–	1	7
1959	9	1	3	13
1960	10	2	4	16
1961	12	–	3	15
1962	6	–	2	8
1963	5	–	1	6

males in the City of London and Dover and in the whole of Great Britain respectively (the latter figures including the former). It is clear, too, that the expansion of range which was in progress between 1940 and 1950 has ceased, at least for the time being, although new sites in the south-east continue to be temporarily colonised. Even now, the only part of the British Isles where Black Redstarts breed with any regularity is the coastal strip of south-eastern England, from Great Yarmouth via the Thames estuary and London to Eastbourne. Nesting in inland cities such as Birmingham is quite sporadic, and nesting in natural cliff sites on the coast surprisingly rare.

Tables 1 and 2 also bring out the fact that the number of pairs proved to breed is a highly unsafe guide to the number of pairs actually likely to have bred. Probably at least half, if not more, of the 'singing males' in each year are, in fact, the males of breeding pairs whose nests have not been discovered. The apparent large increases in breeding pairs in the later 1940's, for instance, are partly due to the return of bird-watchers from the war, who proceeded to track down the singing males

'able 2. Numbers of breeding pairs of Black Redstarts *Phoenicurus ochruros*, nd of singing males holding territories, in the whole of Great Britain from 1940 to 1963

These figures also incorporate those in table 1

ear	Pairs proved to have bred	Pairs not proved to have bred	Territory-holding males not known to have paired	Total territory-holding males
1940	7	–	8	15
1941	9	–	7	16
1942	8	3	38	49
1943	17	4	23	44
1944	14	–	17	31
1945	10	3	18	31
1946	13	5	6	24
1947	15	4	10	29
1948	26	5	32	63
1949	29	1	13	43
1950	38	4	11	53
1951	34	6	15	55
1952	32	4	17	53
1953	25	1	7	33
1954	17	3	13	33
1955	14	6	3	23
1956	20	1	10	31
1957	14	3	12	29
1958	26	1	21	48
1959	16	1	12	29
1960	20	2	10	32
1961	15	2	9	26
1962	11	–	5	16
1963	14	3	3	20

their nests, while the disappearance almost to vanishing point of the gging males not proved as nesting in the City of London in the 1950's s due to similar careful work by observers in London. The high ures for both 1942 and 1958 were due to the aftermath of big migrations of Black Redstarts in April, but in 1942 most bird-tchers were at the war, so only eight nests were located, whereas in 58 the nests of more than half the males holding territories were und. Adding the nests found to the singing males for each of these rs, we get 49 for 1942 and 48 for 1958, a remarkably close resemb-ce.

t would have been desirable to break down the category of 'singing les' into those recorded for only a day or two and those holding ritories for a longer period. Unfortunately, the details given in the d reports do not permit an analysis of this sort for a significant portion of the records. However, it seems probable that the great jority of these were either males of pairs whose mate was not seen, luding, no doubt, some breeding pairs, or males holding a territory

for some time without finding a mate. Any males identified as heard for only a day or two before mid-May have been omitted as being more likely to have been pausing on migration, unless they were heard in known Black Redstart territories of former years.

The Black Redstart, inconspicuous except for its song, is particularly likely to be overlooked, especially as it frequently nests in industrial installations, old quarries, derelict buildings, docks and other places rarely visited by bird-watchers. It is to be hoped that, faced with this evidence of what must have been overlooked during the past 25 years, observers living in places likely to be frequented by breeding Black Redstarts, i.e. any urban or suburban or industrial area in England and Wales, will keep a sharper look-out than hitherto and will make greater efforts to trace the nests of any singing males that may be located.

There is some evidence to suggest that the break-up of the Black Redstart colonies in London and Dover by the rebuilding of bomb-devastated areas is resulting in an increased tendency to scatter and breed in new places within the existing south-eastern breeding area. Redoubled vigilance is therefore necessary in the next few years, especially in the London suburbs and the coastal towns of Kent, Sussex and East Anglia.

SUMMARY OF BREEDING RECORDS DURING 1950-63

1950 Thirty-eight pairs were proved to have bred, the highest total ever recorded in any year either before or since. It is noteworthy that 1950 was also a peak year in Holland (Vleugel 1960). Thirteen pairs bred in the City of London, eleven pairs at Dover, Kent, and others as follows: three pairs in Sussex (Hastings two, Winchelsea one); three pairs in other parts of Kent (Capel one, Deal one, Ramsgate one); Essex, one pair at Shell Haven; Surrey, one pair at Beddington and perhaps another at Guildford; Middlesex, one pair at West Brompton; Suffolk, three pairs at Lowestoft; and Norfolk, three pairs at Great Yarmouth and Gorleston. Elsewhere, there were additional singing males at Guildford, Surrey; Hounslow, Middlesex; Margate, Kent; Walberswick, Suffolk; Cambridge; and Liverpool.

1951 Of the 34 breeding pairs, twelve were in the Dover area and nine in the City of London. Elsewhere, pairs bred at Fairlight, Sussex; Ramsgate, Kent (two); Shell Haven, Essex (four); Beddington, Surrey; Lowestoft, Suffolk (three); Great Yarmouth, Norfolk; and Helmsley, Yorkshire. There were also non-breeding pairs or singing males at Plymouth, Devon; Long Ashton, Somerset; Hastings, St. Leonards, Rye and Pett Level, Sussex; Cromer, Norfolk; Hull, Yorkshire; and Edinburgh. This last record is the furthest north and first for Scotland. Two juveniles seen in a garden in Daventry, Northamptonshire, as early as 10th-12th August suggested breeding in that neighbourhood. Taking the singing males into account, there

may actually have been more breeding and were probably more terri-ory-holding Black Redstarts in Britain in 1951 and 1952 than ever oefore or since.

1952 The total of breeding pairs was almost the same as in 1951, with eleven in the City of London and nine at Dover. Other oreeding took place in Sussex, two pairs (Hastings one, Pett Level one); Kent, three (Deal, Gravesend and Ramsgate one each); Surrey, wo (Beddington one, Croydon one); Suffolk, two (Lowestoft); Norfolk, two (Great Yarmouth); and Essex, one (Shell Haven). inging males were reported also from Eastbourne, Sussex; Margate, Kent; Ponders End, Middlesex; Norwich, Norfolk; Birmingham; and Hull, Yorkshire. The appearance of a male at Upper Broughton, Nottinghamshire, on 10th August was further suggestive of unrecorded reeding in the Midlands.

1953 With a total of only 24 breeding pairs and seven males holding territories, 1953 showed an undoubted decline from ne highwater-mark of 1948-52. The decrease was almost entirely ue to a fall in the City breeding pairs to seven, and in the Dover ones eight. Elsewhere, pairs bred at Pett Level, Eastbourne and Bexhill Sussex; Ramsgate and Margate in Kent; Shell Haven in Essex; owestoft and Great Yarmouth in East Anglia; Birmingham; and a sused U.S.A.F. camp near Higham Ferrers in Northamptonshire. A nging male was also present at Norwich in Norfolk, and a male in waledale, Yorkshire, in the first half of July is unlikely to have been a igrant. A female was seen at Harefield, Middlesex, in late May.

1954 The fall in the number of breeding pairs to 15 was less sharp than it appears, because the total number of males holding rritories was almost identical with that of the previous year. Though over held its own with eight pairs, the fall to two pairs in the City of ondon was balanced by the unusually high number of eight to nine ging males, most of which doubtless did in fact breed undiscovered. sewhere, breeding pairs were recorded only in Sussex (Eastbourne, xhill, Pett Level, St. Leonards) and Essex (Shell Haven). Pairs t known to have bred were located near Evesham, Worcestershire, d Clymping, West Sussex. Singing males, however, were noted at msgate in Kent and at Lowestoft and Great Yarmouth in East glia. At Rishforth in the West Riding of Yorkshire one was seen a moorland clough on 29th May, rather late to be a migrant so far and, while a juvenile noted three times in mid-July at Calver in rbyshire strengthens the feeling that some were breeding unob-ved in the Midlands during these years. A male and a female or nature seen at Wiveton, north Norfolk, on 8th June are also sug-tive.

1955 Though the number of proved breeding pairs fell by only three to 13, the number of singing males was down by half, and 1955 appears to have been the lowest year since 1941 for Black Redstarts in the breeding season. For, though the City of London recovered to eight breeding pairs, this did not correspond to a real increase in population, and Dover crashed to three pairs only, thanks to the demolition of bombed buildings. Elsewhere, Hastings was the only other town to hold any breeding pairs (two or three), and a pair also nested at Pett Level. There was a singing male at Eastbourne, and several records of birds on curious dates—a pair near Hitchin, Hertfordshire, on 4th July; a female or immature at Whaley Bridge, Derbyshire, on 26th May; and a similar bird at Torrance, Stirlingshire, on 15th July.

1956 With breeding pairs up to 20, 1956 showed a slight revival, despite the fact that only a single pair bred at Dover. However, the City of London still stood at eight pairs, with others in Sussex (Eastbourne two, Pett Level one); Surrey (Croydon area four); Suffolk (Beccles one); and Norfolk (Gorleston one, Great Yarmouth two). Other pairs or singing males were reported from Hastings, Herne Bay (Kent) and Norwich. The following abnormal dates also pointed to unrecorded breeding: Titchfield Haven, Hampshire, one on 21st July; Portslade, Sussex, one on 7th June; Sheriff's Lench, Worcestershire, an immature male at a ruined barn on 10th July.

1957 The decrease of known breeding pairs to 14 was balanced by an increase of males certainly holding territories. The contribution of the London and Dover bombed sites fell to six and one respectively, and was reinforced by pairs in Sussex (Pett Level one), Kent (cliffs between Dover and Folkestone two, Faversham one) and Surrey (Croydon three). Other pairs or singing males were recorded at Bexhill, Sussex; Margate and Ramsgate, Kent; and Marsden, Co. Durham—the last unusually far north. Abnormal dates included a male at Stratton St. Margaret, Wiltshire, on 25th August, not far from many suitable nesting sites in the Swindon goods yards; a male at Hutton, Essex, on 13th July, which could, of course, have wandered from the City; and a male at Wraysbury, Buckinghamshire, on 18th-19th August, which links forward to records on the opposite side of the Thames in 1958-59.

1958 This was a year of an unusually large early April migration of Black Redstarts and, as in 1942, there was a subsequent increase, probably a real one, in reports of both breeding pairs (26) and males holding territories, both being nearly doubled compared with 1957. To this large total the City of London contributed five pairs and Dover only one. Elsewhere, it was made up of two pairs from

Sussex (Eastbourne, Pett Level), seven from Kent (cliffs Dover-Folkestone three, Faversham two, Northfleet one, Gillingham one), three from Surrey (Croydon), one from Middlesex (Paddington), one from Cambridgeshire (Ely), two from Suffolk (Ipswich, Lowestoft), three from Norfolk (Great Yarmouth two, Cromer one) and one from Nottinghamshire (Nottingham), a first breeding record for the last-named county. The known breeders were reinforced by singing males at Hastings (six, some of which must have bred), Canterbury, Rochester, Oxford (almost certainly), Windsor Castle, Norwich, Cheltenham, Hereford, Birmingham and Sheffield. Birds seen on dates pointing to unrecorded breeding were a juvenile with yellow gape-flanges, which must have been reared near-by, in the New Forest on 29th August; one at Alfriston, Sussex, on 29th June; and a male near the power station at Kingston-on-Thames, on 12th July. It is noteworthy that the scatter of birds over the country was much wider, especially on the west side of England, than in most other years in the 1950's.

1959 The high totals of 1958 were not sustained, breeding pairs falling to 16 as follows: Sussex one (Eastbourne); Kent seven (Dover five, Canterbury one, Dartford one); City of London five; Suffolk one (Lowestoft); Norfolk one (Norwich); and Northamptonshire one (Peterborough). The tenacity with which the London and Dover colonies were hanging on and adapting themselves to the disappearance of bombed sites was remarkable. Singing males were recorded in 1959 at Hastings (five), Woolwich Arsenal, Croydon, Great Yarmouth, Birmingham and probably Nottingham. Suggestive dates included a pair in Windsor Forest, Berkshire, on 13th May and a male on the Coombe Canal near Cheltenham on 29th May.

1960 A slightly better year, with pairs proved to have bred at Eastbourne, Deal, Colchester, Ponders End (Middlesex), Norwich, Great Yarmouth and Peterborough (two pairs), as well as five pairs in both the City of London and Dover. Another pair must have bred near Dagenham Dock, Essex, a second pair attempted to breed unsuccessfully at Norwich and one or two more pairs may have bred in the City of London. Singing males held additional territories in Eastbourne, St. Leonards-on-Sea, London (Islington, City) and Great Yarmouth. A male was seen at Tidpit, Hampshire, on 30th June, and August wanderers occurred at Alresford, Hampshire, and Hardwick, Derbyshire.

1961 A reversion to the low level of 1959, with breeding proved only at Croydon Power Station (one pair), the City of London (five pairs), Dover area (seven pairs), Lowestoft and Great Yarmouth. A juvenile ringed at Eastbourne on 30th July suggested an unrecorded breeding in that town, which usually holds at least one pair. A series

of Midland records also suggested one or more unrecorded breedings: Worcester, a pair not proved to have bred; a probable singing male in Birmingham; and two individuals in Staffordshire, at Cannock Chase in June and Blithfield Reservoir in July. Other singing males held territories in Margate and Deal (but only in April, so perhaps on migration), London (Tower Hill and Bloomsbury and three in the City) and Ipswich. July birds at Sanderstead and in north Norfolk may have

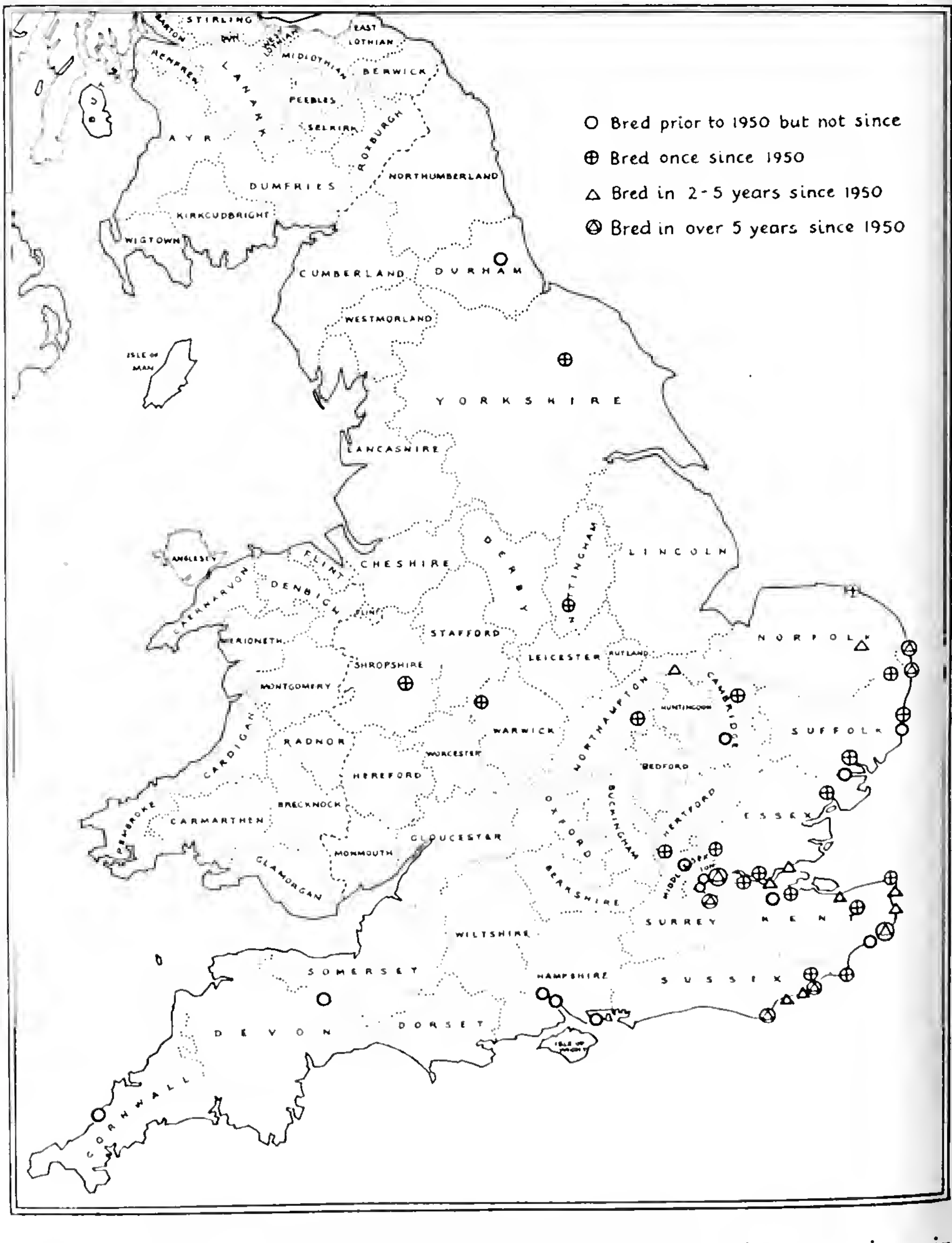

FIG. 1. Map to show breeding localities of Black Redstarts *Phoenicurus ochruros* in Great Britain up to and including 1963

come from Croydon and Yarmouth respectively, but the origin of others at Portland, Dorset, and Grosmont, north Yorkshire, is less obvious.

1962 The poorest year for Black Redstarts since 1945, with only eleven known breeding pairs, of which two were in the City of London, where the bulldozers were really getting to work, and four at Dover; otherwise only breeding pairs at Eastbourne and on Croydon Power Station, unsuccessful pairs at Dungeness (two) and Lowestoft, and singing males at Hastings (two), the City of London (two) and Surrey County Hall at Kingston-on-Thames.

1963 The very low level of 1962 was not maintained, but recovery was only to the still comparatively low level of 1961, both London and Dover continuing to make a poor contribution, with three and two pairs respectively. Other pairs were proved to breed only at Dungeness (two), near Ironbridge in Shropshire (two, the first breeding records for that county), Croydon Power Station, Moor Park (the first breeding record for Hertfordshire), Sizewell Power Station in Suffolk, Norwich and Great Yarmouth. A pair probably bred at Nottingham, another was suspected of breeding at Rockingham, Northamptonshire, and a third was present at Luton, without breeding being proved. This wider spread of breeding or potentially breeding pairs suggests the possibility of the London birds being driven away by destruction of their habitat, and finding alternative sites in the country. There were singing males in the City of London and Bloomsbury, and, in addition, a male was seen at New Waltham, Lincolnshire, on 1st June, a female at Brighton on 8th June, and another female at Easton Broad, Suffolk, on 12th June.

SUMMARY OF RECORDS BY COUNTIES

Counties are listed in alphabetical order and the pre-1950 history is noted briefly in each case. † indicates no breeding record before 1950.

Bedfordshire. A male in Luton in April and May 1958, and a pair there from May to July 1963, but no proof of breeding.

Berkshire. A singing male at Windsor Castle in 1958 and a pair in Windsor Forest on 13th May 1959.

Buckinghamshire. A male at Wraysbury on 18th-19th August 1957.

Cambridgeshire. Bred most years 1937-42. A pair bred at Ely in 1958. A singing male held territory in Cambridge in 1950, but birds seen there on 29th April and 10th May 1956 and on 11th May 1959 may only have been on passage.

Cornwall. Bred 1929-39. No breeding season records during 1950-63.

Derbyshire. A juvenile seen three times in mid-July 1954 at Calver. A female or immature at Whaley Bridge on 26th May 1955. One at Hardwick on 21st August 1960.

Devon. Bred 1942. A singing male at Plymouth in 1951.

†**Dorset.** A female at Blacknor Point, Portland, on 7th July 1961.

Durham. Bred 1845. A male held territory at Marsden in 1957.

Essex. First bred Shell Haven 1949. Continued to breed at Shell Haven until 1954, and a hen was seen there on 20th April 1955. A pair bred at Hythe, near Colchester, in 1960 and in the same year a pair were seen with a juvenile at Dagenham Dock in June. A male was seen at Hutton on 13th July 1957. The lack of breeding records in Southend and other Essex coastal towns is surprising.

†**Gloucestershire.** A male held territory in Cheltenham in 1958; a male near-by on the Coombe Canal on 29th May 1959.

Hampshire. Bred 1943-45. A juvenile with yellow gape flanges on 29th August 1958 in the New Forest was strongly suggestive of breeding near-by. Other overlooked breeding was suggested by records of a male at Titchfield Haven on 21st July 1956, a male at Tidpit on 30th June 1960 and two at Alresford on 27th August 1960, but two records in the first half of May 1962 were more likely to have been migrants.

†**Herefordshire.** A singing male in Hereford and another male in a garden at Bridstow in 1958.

†**Hertfordshire.** A pair bred at Merchant Taylors' School, Moor Park, Rickmansworth, in 1963. A hen at Northaw on 9th August 1963 was probably a wanderer from either there or the City. A pair near Hitchin on 4th July 1955.

Kent. First bred 1930, and regularly since 1941. Dover continued to be the headquarters of the Kent population throughout the period, for when their favourite haunts in the town were demolished in 1954/55, some pairs moved out to the chalk cliffs towards Folkestone. Many other Kent coast towns, e.g. Deal, Ramsgate, Margate, Faversham, Gravesend, Gillingham, Northfleet and Dartford, held at least one breeding pair some time during the period, though mainly in the 1950's, while in 1962 and 1963 two pairs bred at the new Dungeness Power Station. Other coastal towns, such as Herne Bay and Rochester, held singing males. Canterbury was surprisingly the only inland town in either Kent or Sussex to hold a breeding pair.

†**Lancashire.** A singing male at Liverpool in 1950.

†**Lincolnshire.** A male at New Waltham on 1st June 1963.

Middlesex. Has bred regularly since 1926. Throughout the period the City of London continued to be the main stronghold in Middlesex, the great majority of pairs frequenting the large, open bombed area around Cripplegate Church, which began to be rebuilt about 1954. Within ten years this area had been almost built up again, but still held three breeding pairs in 1963. The few pairs proved to breed away from the City included one at West Brompton in 1950, one at Ponders End in 1960, and one at Paddington in 1958. The last-named record was not, as stated in the *London Bird Report* for 1958, the first in Inner London away from the City since the war, for a pair bred in Westminster in 1948. Singing males have been recorded from time to time in Bloomsbury, Fulham, Islington and other parts of the former County of London. There have, however, been surprisingly few in suburban Middlesex—only at Hounslow in 1950 (a pair) and Ponders End in 1952, and a female at Harefield in late May 1953.

†**Midlothian.** A singing male in Edinburgh in 1951, the only territory-holding Black Redstart recorded for Scotland.

†**Norfolk.** From 1950 onwards there was usually at least one breeding pair in Great Yarmouth, in several years also in Norwich, and once in Cromer as well.

Several summer records also suggest the possibility of breeding on other parts of the north Norfolk coast, e.g. Wiveton on 8th June 1954, Scolt Head on 12th July and Kelling Heath on 16th July 1961.

†**Northamptonshire.** In 1953 a pair bred in a heap of bricks in a U.S.A.F. camp at Chelveston, near Higham Ferrers. In 1959 one pair, and in 1960 two pairs, bred in the precincts of Peterborough Cathedral. In 1951 two juveniles were seen in a Daventry garden on 10th-12th August, and in 1963 breeding was suspected at Rockingham Church.

†**Nottinghamshire.** A pair bred at Nottingham in 1958, and probably in 1963, while there was a probable singing male in 1959. A male was seen at Upper Broughton on 10th August 1962.

†**Oxfordshire.** An almost certain singing male in Oxford in 1958.

†**Shropshire.** Two pairs bred north of Ironbridge in 1963 (Rutter *et al.* 1964, though mentioned only casually without any details in the county report for 1963).

†**Somerset.** A singing male at Long Ashton in 1951.

†**Staffordshire.** One at Cannock Chase on 6th June 1961 and one at Blithfield Reservoir on 23rd July 1961.

†**Stirlingshire.** A female or immature at Torrance on 15th July 1955.

Suffolk. Has bred sporadically since 1939. At least one pair, and sometimes three or more, bred in Suffolk in most years during the period, usually in Lowestoft, but also from time to time in Aldeburgh, Beccles, Ipswich, Gorleston and the new Sizewell Power Station. Singing males held territories in Walberswick in 1950 and in Ipswich in 1960 and 1961, and on 12th June 1963 a hen was seen at Easton Broad.

Surrey. Has bred sporadically since 1941. The neighbourhood of the new Croydon Power Station at Beddington was the metropolis of the species in Surrey in this period, and no breeding pairs were certainly reported anywhere else. South London, which had held breeding pairs during the war, produced only a few singing males. The only extra-London singing males were reported in 1950 from Guildford, where breeding was suspected as it was also in 1948, and from the Surrey County Hall at Kingston-on-Thames in 1962, where a male was also seen in July 1958.

Sussex. Perhaps bred 1909, then sporadically from 1923, and almost every year since 1941. Pett Level, Hastings and St. Leonard's-on-Sea, all former strongholds, were often untenanted by proved breeding pairs during this period, especially latterly when Eastbourne became the bird's Sussex headquarters. At various times there were breeding pairs in Winchelsea, Fairlight and Bexhill in east Sussex, and probably Clymping in west Sussex, while breeding season records also came from Rye, Alfriston and Brighton in the east and Portslade in the west. The failure of the Black Redstart to colonise the Sussex coastal towns west of Beachy Head remains puzzling.

Warwickshire. Bred in 1943. A pair bred in Birmingham in 1953, and singing males held territories there in 1952, 1958, 1959 and probably 1961.

†**Wiltshire.** A male at Stratton St. Margaret's, near Swindon, on 25th August 1957.

†**Worcestershire.** A pair probably bred near Evesham in 1954 and on 10th July 1956 an immature male was seen at a ruined barn at Sheriff's Lench, not far away. In 1961 there was a pair in Worcester from May to July, but no proof of breeding.

Yorkshire. A pair bred in Helmsley in 1951. Singing males were reported in Hull in 1951 and 1952 and in Sheffield in 1958. Other birds seen between May and July were a male at Arngill in Swaledale in the first half of July 1953, one in a moor-

land clough at Rishforth on 29th May 1954, and one at Grosmont, North Riding, on 23rd July 1961.

There are thus six counties where the Black Redstart bred for the first time during 1950-63, namely Hertfordshire, Norfolk, Northamptonshire, Nottinghamshire, Shropshire and Yorkshire, and two where it either probably bred or a pair was present without breeding being proved, namely Bedfordshire and Worcestershire. In three counties where the species bred before 1950, however, it was not proved to breed from 1950 onwards: these are Cornwall, Devon and Hampshire, though it probably did breed in Hampshire in 1958.

Apart from the above, singing males occupied territories during 1950-63 in four counties where they had never done so before, namely Berkshire, Herefordshire, Somerset and Midlothian. Glamorgan was the only county where a non-breeding Black Redstart occupied a territory before 1950 but not afterwards.

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SUMMARY

This paper summarises the records of Black Redstarts *Phoenicurus ochruros* breeding and holding territories in Great Britain during the 14 years from 1950 to 1963. The number of pairs proved to have bred (almost all in eastern and south-eastern England) reached a peak of over 30 in 1950-52, but since then, except in 1953 and 1958, has never risen above 20 and has been as low as eleven. There has been a similar decline in the total number of territory-holding males recorded, with a peak of 53-55 in 1950-52 and a low point of 16 in 1962. The number of pairs proved to breed is shown to be an unreliable index to the number actually likely to have bred.

In many years more than half the breeding pairs and territory-holding males have been located in the City of London and in the area of Dover, Kent. At least part of the general decline is due to the steady disappearance of suitable nesting sites in these areas.

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Moult and its relation to taxonomy in Rock and Water Pipits*

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TWO SUCCESSIVE list-committees of the British Ornithologists' Union have held widely divergent views on the taxonomic treatment of the Rock Pipit populations of the British Isles, and there is clearly a little-understood problem of geographical differentiation in this interesting group which it is hoped the following study will help to clarify.

In the 1952 *Check-list of the Birds of Great Britain and Ireland*, two native and three extra-limital forms were included under *Anthus spinoletta.* Leaving aside for the moment the question of whether or not the Rock and Water Pipits should be regarded as conspecific, the native forms admitted were *meinertzhageni* of the Outer Hebrides and *petrosus* over the remainder of Britain and Ireland; and the extra-limital forms were the Water Pipit *spinoletta,* its American counterpart *rubescens*, and the Baltic Rock Pipit *littoralis.* Later, Meinertzhagen and Williamson (1953) mentioned their inability to separate the Rock Pipits of the Outer Hebrides, Orkney, Shetland and the north Scottish mainland from *kleinschmidti* of the Faeroe Islands. Subsequently, a new B.O.U. Taxonomic Sub-Committee looked at these forms, together with two others described by P. A. Clancey (*ponens* from Ushant in north-west France, and *hesperianus* from the Isle of Arran in the Clyde estuary) and lumped them all together under the oldest available name *petrosus*, saying they 'could not see the alleged differences between populations from the Faeroes to Ushant' (*Ibis,* 98: 166).

Witherby *et al.* (1938) accepted *meinertzhageni* as a valid form, but excluded *kleinschmidti* on the grounds that it was restricted to the Faeroe Islands. Baxter and Rintoul (1953) also accepted *meinertzhageni* as the Outer Hebrides bird. Bannerman (1953) refused to accept the conspecificity of the Rock and Water Pipits: of the former he included as 'British' nominate *petrosus* and the forms *meinertzhageni* and *littoralis.* Vaurie (1954) acknowledged 'three slightly differentiated races: *kleinschmidti* in the Faeroes, *petrosus* in the British Isles and coasts of northwestern France, and *littoralis* in the Baltic and White Sea.' He was noncommittal concerning Norwegian birds, including them (with a

*A publication of the B.T.O. Moult Enquiry.

query) under *petrosus* (Vaurie 1959). Hall (1961) extended the range of *kleinschmidti* to the Hebrides, otherwise recognising only *petrosus* and *littoralis* among the Rock Pipits.

Before embarking upon a taxonomic comparison of Rock Pipits from various localities it is necessary to bear in mind that these birds moult their contour feathers twice a year, and that in this species the taxonomy is inseparably linked with moult. Adults have a complete moult, including wings and tail, in the autumn (August-September), while juveniles have a change of body-feathers and some wing-coverts which gives them a first-winter plumage identical with that of adults. A partial moult of body feathers and some coverts (not the greater coverts), also occasionally the middle pair of rectrices and one or more tertials, takes place early in spring (late January-early March). This moult is individually variable in extent within all populations, as pointed out by Mayaud (1942) and repeated by Hall (1961); but it is important to understand the nature of the change for it does not appear to be on record that the moult is of a different kind in different populations, resulting in a distinctive dress in some, and in a new plumage much like the winter dress in others. The extremes of these plumage-types among the Rock Pipits are *littoralis* (fully-moulted examples of which resemble partially-moulted *spinoletta*) and *kleinschmidti* (which shows very little plumage-change from one season to the other).

It is therefore essential, if satisfactory results are to be obtained, to compare only birds from the same season, and the most valid comparisons are between late spring ones. There are two reasons for this. Firstly, the winter plumage is similar in all populations; and, secondly, there is much movement, of northern birds especially, at that season, so that one can never be sure that a series collected at any given locality represents a discrete population. In stating an opinion that they could find no constant difference between the named forms in the British area, some workers clearly based their examination on freshly-moulted autumn birds, which is a fairly usual taxonomic practice; it is difficult to see how they could have reached any other conclusion with such material. The opposite situation is provided by late spring birds which are well advanced in pre-nuptial moult, and can reasonably be assumed to be on, or on the way to, their breeding-grounds, for appreciable differences between certain populations can then be found.

When such an examination is made, three groups appear to be acceptable as native to the British Isles. The birds of Shetland and Fair Isle, and perhaps those of St. Kilda and the northern isles of Orkney, agree well with the Faeroe Islands *kleinschmidti*, while the greatest contrast with these is provided by *meinertzhageni* from the Outer Hebrides. Over the rest of the British Isles and Ireland the name *petrosus* can be used, though some populations (e.g. western Scotland, Inner Hebrides and the southern part of Orkney) show the

intermediate characteristics which one would expect to find in birds with a nearly continuous range.

WEST EUROPEAN RACES OF ANTHUS SPINOLETTA

Anthus spinoletta spinoletta Linnaeus, 1758, Syst. Nat. ed. 10, p. 166, Italy. Mountainous country in central and southern Europe, eastwards to Asia Minor.

Autumn. The Water Pipit has a more distinctive winter dress than the Rock Pipits, being browner above, the feather-centres darker brown than the fringes but not markedly contrasting, and the ground-colour of the under-parts off-white. There is a faint salmon-pink blush in the white of the belly, which has a more immaculate appearance than in the Rock Pipits owing to the reduction of the flank streaking. Specimens from the Pyrenees in the British Museum (Natural History) differ from other European ones in having a pale primrose suffusion on the underside; this might, however, be due to a difference in the method of preparation.

Spring. The pre-nuptial moult is mostly confined to the head, nape, throat and breast, sometimes extending to the mantle and belly. The breast-spots are either entirely or only partially lost when the dark-centred winter feathers are cast, and new unspotted vinous-pink feathers take their place. Rarely the whole underside is pervaded by this colour; more usually some brown streaking remains on the breast and flanks. Those birds in which a fair number of dark-centred feathers remain are very like spring *littoralis*, even to the new greyish-fringed feathers of the head and nape, but the general tone of the under-parts remains off-white in the Water Pipit, and creamy-buff or yellowish in *littoralis*. There is a pronounced creamy-white supercilium. The outermost tail-feather has a long white wedge on the inner web, extending to a point near the shaft about two-thirds of the way along the feather, the outer web being white. There is a smaller white triangle on the inner web at the tip of the penultimate feather, and a white notch at the tip of the next innermost. It should be stressed here, however, that the pattern on the penultimate rectrix is not a good taxonomic character, being variable within the group as a whole (Hall 1961).

Anthus spinoletta littoralis C. L. Brehm, 1823, Lehrb. Naturgesch. aller eur. Vogel, pt. 1, p. 239, Oehe Island, Schleimunde, Baltic Sea (often given as 'the Danish islands').

Coasts and islands of the Baltic north to Lapland; western and northern Norway east to the Kola Peninsula. Winters mainly on the Channel coasts of England and France.

Autumn. There is little difference from the Water Pipit in the brownness of the upper-parts, the fringes being slightly more olive. The main difference is in the under-parts: the breast-spots are larger and more diffuse, the flanks more heavily streaked, and the ground-colour creamy-buff, not off-white.

Spring. The individually variable spring moult is similar to that of *spinoletta*, a number of dark-centred feathers with greyish-olive fringes coming into the head, nape and mantle, and vinous-tinged feathers replacing the brown-spotted ones on the breast. However, a number of new pale yellowish feathers also appear, and there are two broad kinds as pointed out by Mayaud (1952)—yellowish birds with comparatively few spots and a good many vinous feathers on throat and breast, and whitish birds retaining many worn dark-centred breast-feathers with little or no vinous colouring. A series from Vadsö, Varangerfjörd, north Norway, illustrates this disparity well, the 'moulted' birds being greyer and the 'unmoulted' ones browner on the mantle. Of two from Smölen Island, north Norway, one is decidedly yellowish, the other only slightly so; and there are whitish birds with a fair amount of spotting from other parts of the Norwegian coast. This diversity is discussed further on page 498. There is a noticeable creamy-white supercilium. In the

outermost tail-feather the pale wedge seldom reaches more than half-way along, and only the distal part is white, the inner portion being dusky. Similarly, the white triangle at the tip of the next feather is somewhat reduced and less pure. A pale notch is usually present at the tip of the third.

Anthus spinoletta petrosus (Montagu), 1798, Trans. Linn. Soc. Lond., 4, p. 41, coast of Wales.

Coasts of north-west France, Great Britain and Ireland (except the Outer Hebrides and Shetland).

Autumn. Very like *littoralis*, the mantle fringes generally a purer olive, the belly perhaps a rather brighter, pale yellow.

Spring. There is a fairly extensive body moult, but only rarely is this of *spinoletta*-type, except in the Breton and Vendée populations of France as pointed out by Mayaud (1952). The new feathers are similar to those of autumn plumage, and the breast-spotting shows hardly any reduction. The mantle, nape and head are a greyer olive. In those specimens which develop the vinous feathers these usually appear as a fringe surrounding the whitish throat. The supercilium is reduced and is not very noticeable. The wedge on the inner webs of the outermost and penultimate tail-feathers is very dusky, and white-tipped only in the new plumage.

Anthus spinoletta meinertzhageni Bird, 1936, Bull. B.O.C., 56, p. 55, Lochboisdale, South Uist.

Outer Hebrides (except perhaps St. Kilda).

Autumn. Above very similar to *petrosus*, but yellower and more like *kleinschmidti* below, and only distinguishable from that race by the browner fringes and darker feather-centres of the upper-parts.

Spring. The new spring plumage is altogether darker than in either *petrosus* or *kleinschmidti*, the feather-centres of the upper- and under-parts being blackish rather than dark brown. The fringes of the mantle feathers are greenish-olive, brighter than in *petrosus*, this colour being especially noticeable on the uniform rump. The ground-colour of the under-parts is creamy-buff, paler than in *petrosus* and not nearly so bright as in *kleinschmidti*. A few vinous feathers appear around the whitish throat in most birds and (as in *petrosus*) an occasional specimen acquires some *spinoletta*-type nuptial plumage on the breast. The ear-coverts and sides of head are greyish-brown as in *petrosus*, and the supercilium and outer tail-feathers are as in that form. The blacker mantle and breast-markings are also obvious when juvenile specimens are compared with unmoulted juveniles of *petrosus* and *littoralis*.

Anthus spinoletta kleinschmidti Hartert, 1905, Vögel pal. Fauna, p. 284, Nólsoy, Faeroe Islands.

Faeroe Islands and Shetland (including Fair Isle) and possibly St. Kilda. Some winter on the west and north-east Scottish coasts and in Ireland.

Autumn. This form is a yellower olive on the feather fringes of the upper-parts than the other races; the centres are a little darker than in *petrosus* and *littoralis*, but not blackish as in *meinertzhageni*. It is more heavily suffused with a deeper, brighter yellow below, especially on the belly, and heavily washed with olive on the flanks. The breast-spots are large and often coalesce to give a 'clouded' effect. The chin and throat are yellowish-white.

Spring. There is a fairly full body-moult, but the new feathers are very similar to the old, so that the bird is still yellowish-olive above, especially marked on the unstreaked rump, and a brighter yellow below than the other races. Some acquire a few small vinous-tinged feathers surrounding the pale throat, but this seems to be the only concession to the *spinoletta*-type of nuptial dress. The ear-coverts and sides of head are yellowish-brown, not greyish-brown. There is practically no supercilium and the pale portions of the outer tail-feathers are brownish-white.

CONSPECIFICITY OF WATER AND ROCK PIPITS

The pipits customarily included under *A. spinoletta* fall into two distinct ecological groups—the alpine Water Pipits, which have representatives over much of Eurasia and North America (including West Greenland), and the littoral Rock Pipits, which are uniquely west European. The breeding ranges of the two groups do not overlap, so that a potential incompatibility arising from differences in habitat, food-preferences, song and other behaviour has never been put to the test. Contrary to other authors, Bannerman (1953) treated the two groups as distinct species, the Water Pipits under *A. spinoletta* and the Rock Pipits under *A. petrosus*. If geographical replacement were the sole criterion of conspecificity, then there would be every justification for Bannerman's view.

However, a more cogent factor in this case is surely the near relationship expressed by their morphological likeness and the similarity in the pattern of moult. To take the latter first, the post-nuptial moult is complete in all populations, while the pre-nuptial moult comprises two variables—the extent to which moult takes place at all, and (when it does) the extent to which it produces a distinctive nuptial dress, or one which closely resembles the off-season plumage. Passing from one extreme to the other, we have an orderly arrangement of *spinoletta*, *littoralis*, *petrosus*, *meinertzhageni* and *kleinschmidti* so far as the second variable is concerned.

Bannerman attached importance to the supercilium (prominent in the Water and greatly reduced in the Rock Pipits) and outer rectrices (white in the former, dusky in the latter); but here too we find a progression from *spinoletta* through *littoralis* (supercilium well-marked, the white in the tail not entirely suppressed), *petrosus* and *meinertzhageni* to *kleinschmidti* (supercilium vestigial, pale portions of the tail-feathers always brownish). In these characters as well as the moult-pattern, therefore, we find intermediacy of the kind which characterises related populations with a continuous or nearly continuous range. This, combined with the fact of allopatry, seems more to favour the conservative view that the alpine and littoral groups should be regarded as geographical representatives of one species, the oldest name for which is *spinoletta*.

COMMENTS ON THE RACES

Meinertzhagen (*Ibis*, 1934: 56) collected an autumn series in the Outer Hebrides and hinted that, as some specimens resembled *kleinschmidti*, this might be the breeding form; it occurs there, however, as a migrant. Bird (1936) gave a correct diagnosis of this new form *meinertzhageni*, stressing the general darkness of both upper- and under-parts, the much darker breast-spots, and the virtual absence of yellow from the belly. Clancey (1942) synonymised *meinertzhageni* with *kleinschmidti*,

but did not say to what season his comparative material belonged: one suspects that his opinion was founded on autumn birds, a mistake which was later repeated by Meinertzhagen and Williamson. Vaurie (1954, 1959) synonymised *meinertzhageni* with *petrosus*—with rather more justification, since the two are certainly closer than is *kleinschmidti* to either; but the characters given by Bird and reiterated here are constant in the breeding birds I have examined (upwards of 20) and the race merits acceptance.

Two names have been applied to the Breton population—*immutabilis* Degland, 1849, and *ponens* Clancey, 1942: the type of *ponens* is a moulting male dated 20.ix.1933, and a co-type in the Meinertzhagen collection is an abnormal bird in a *spinoletta*-type nuptial plumage although dated 22.ix.1933. These can hardly be said to provide a sound basis for a new race of Rock Pipit. Similarly, Clancey's description of *hesperianus*, the type of which is an adult female collected in the Isle of Arran on 14.viii.1940, is not well founded: breeding birds from Argyll appear to be *petrosus-meinertzhageni* intergrades, and it seems unlikely that Clyde birds will be different from these or perhaps from *petrosus*. Degland's birds were from Dieppe (though said to breed in Brittany 200 miles to the west) and so might have been *littoralis* on passage or wintering; Clancey restricted the type-locality to Dieppe in order to establish *ponens* for the Breton birds. This is a variable population in respect of its breeding-dress: in his study of the species Mayaud (1952) showed that many in south Brittany and Vendée have a *spinoletta*-type nuptial plumage, while others are similar to *petrosus*, and it would seem best to include this highly variable group under the latter name.

This diversity within the same population occurs also in Norway, as we have seen, and would be very noticeable in the field. This fact was well known to Henry Seebohm and others many years ago and was discussed in some detail by Aplin (1907). It is the probable explanation of an observation by Blair (1936) who found two pairs of *littoralis* near the estuary of the Storelv, ten miles east of Vadsö, which fed among heaps of washed-up seaweed and carried food inland to a scrub-covered flat where Red-throated Pipits *Anthus cervinus* were also nesting. They were conspicuously washed with vinous on throat and breast and 'were distinguishable at a glance from a pair of *petrosus* which had a nest in a nearby sand-cliff and regularly fed on the same stretch of shore'. He did not further describe these birds, but it would seem likely that they were comparatively unmoulted examples with spotted breasts, and that his two kinds could be equated with the two kinds represented among the Vadsö skin material described under *littoralis* above.

Some authors, including Mayaud (1952) and Hall (1961), have restricted the range of *littoralis* to the Danish islands and Baltic Sea, and the north-west coast of Europe from Varangerfjord east to the Kola

Peninsula, regarding west-coast Norwegian birds as *petrosus*. These west Norwegian ones have in fact received a name, *schioleri* Christiani (*D.O.F.T.*, 1920: 157), usually placed as a synonym of *petrosus*. Throughout Scandinavia, birds are so variable in the extent of the *spinoletta*-type nuptial plumage they acquire that it is probably best to regard them all as belonging to *littoralis*, while recognising that some west Norwegian birds are more closely similar to *petrosus*.

There must always be some difficulty in the correct identification of races of *Anthus spinoletta*. In autumn, plumage differentiation between *petrosus* and *littoralis* on the south coast of England and north coast of France (including the Channel Islands), where the two mix as wintering birds, is well-nigh impossible. A good eye could discriminate between the richly-coloured local form *kleinschmidti* and the paler migrant *littoralis* from Scandinavia in the far north of Britain, where *petrosus* is unlikely to occur. There are in the Royal Scottish Museum two Rock Pipits of W. Eagle Clarke's collecting at Fair Isle, males dated 30.ix. 1905 and 7.ix.1908, in which the colouring is more diluted than in other Fair Isle birds, and which can with some confidence be placed as migrant *littoralis*.

The northern *kleinschmidti*, by virtue of retaining a winter-type plumage after the spring moult, is easily recognisable at that season; *meinertzhageni* of the Outer Hebrides is altogether darker and has a distinctly greenish, not yellowish, tinge above, especially on the rump, while the sides of the head and the ear-coverts are greyish, not brown. The Outer Hebridean bird is connected to *petrosus* by intermediate populations in the Inner Hebrides (specimens seen from Muck dated 3.iv, and Sleat, Skye, dated 22.iii), southern Orkney (breeding males examined from Pentland Skerries dated 13.v and 14.v) and probably the north and west coasts of Scotland. Birds from Wales and the West Country, nearest the type-locality of *petrosus*, differ from *meinertzhageni* in having the feather-centres of the upper-parts and breast brown not blackish-brown, the under-parts pale yellow rather than creamy, and the fringes of the mantle olive not greenish.

There is a danger of confusion in sight records between partially moulted vagrant Water Pipits *spinoletta*, and returning migrant *littoralis*, along the south and east coasts of England during March and April (see page 502). There is more white in the outer tail-feathers and a better supercilium in *littoralis* than in other Rock Pipits, and in these characters the difference from Water Pipits is slight. The Scandinavian bird tends to have pale yellowish, not off-white, under-parts—as has one in the British Museum (Natural History), which was taken at Brighton and misidentified as a Water Pipit.

THE MOULT

Since taxonomic differences in this group are clearly vested in regional

differences in the pattern of moult, this aspect of the seasonal cycle should be considered in greater detail.

Post-nuptial moult

The only full data on the complete autumn moult of adults is in respect of *kleinschmidti* at Fair Isle, of which there are 18 records showing a time span from mid-July to early September, all noted on B.T.O. Moult Record Cards.

The first in change were trapped on 13th and 15th July, with primaries 1-3 (descendant numbering) and the greater coverts in pin; a late starter on 24th July has primary 1 only in sheath. Analysis of the cards suggests that the body-moult is delayed until after the start of primaries 1-2, which slightly precede the tertials and major coverts. The first to show tail-moult, with some feathers in sheath but a few old ones remaining, is dated 2nd August, and primaries 1-3 have been renewed. Birds appear to be half-way through the moult of primaries, and to have begun the tail, before replacement of the secondaries begins. Birds dated 26th, 27th and 31st August are completing the growth of the outermost long primaries 8-9 and the innermost secondaries 5-6 and have practically completed body moult.

A *meinertzhageni* from Benbecula, dated 28th August, is at a similarly late stage, while a male from Balranald, North Uist, dated 2nd September, is a little behind; these suggest that the moult has much the same timing as in *kleinschmidti*. There are, however, two late birds only just finishing on 15th and 16th October.

A *petrosus* from St. Tudwal's Isle, north Wales, dated 17th August, is the only moulting example I have seen from the southern part of the Rock Pipit's total range, and it is a week or ten days ahead of the northern birds.

Three juveniles changing to first-winter at Fair Isle at the end of August were renewing the tertials and wing-coverts (except the primary and outer greater coverts), and showed considerable moult on body and head. Young *petrosus* from Skokholm and the Calf of Man on dates between 4th and 23rd August were also replacing the middle pair of tail-feathers.

Pre-nuptial moult

The extent of the spring moult, as emphasised, is individually variable. I have examined a series of migrant *littoralis* collected on Heligoland (April-May 1877-80) and a series of *kleinschmidti* collected at Tarbatness, East Ross-shire (February-early April 1916), as well as individual birds from other localities.

In general terms, it appears that moult of the middle or middle and distal (rarely all three) tertials, plus the middle pair of tail-feathers, is usual, and that the birds which change these feathers have a more ex-

tensive body-moult than those which do not. A substantial proportion of *littoralis* appears to have the moult suppressed, and this is true also (as pointed out by Mayaud) of Breton *petrosus*, but less true of birds from Britain and Ireland. Four Ushant birds, dated 13th-15th April, show little change and are very worn above and below. A male from Vadsö, Varangerfjord, dated 28th May, had changed the distal tertials and middle rectrices, and had undergone considerable body-moult; but birds from Smölen Island, dated 26th, 27th and 31st May, had not changed any of these feathers, and had undergone very little body moult, so resembling a worn *petrosus* type.

None of the Tarbatness series shows moult of tertials or rectrices until 18th March, though body moult is evident from mid-February; one, dated 5th April ('testes large'), is very worn and does not appear to have had any moult. I have seen only three spring birds from Nólsoy, Faeroe Islands, the type-locality of *kleinschmidti*. Of these, a male dated 19th February was in full winter dress; of two other males dated 28th March, one had undergone a fairly full body moult with new feathers similar to the winter plumage covering upper-parts and breast, but those of the throat white and with a soft vinous-pink bloom, while the other had changed only a few feathers at the sides of the throat. By contrast with these northern birds, two *petrosus* from Achill Island, Co. Mayo, dated 10th and 12th January, had already progressed some way with the pre-nuptial body moult, having new vinous-tinged feathers at the sides of the breast.

ABNORMAL MOULT

A specimen of *petrosus* from Waterville, Co. Kerry, dated 16th October 1945, has *spinoletta*-type nuptial plumage on the sides of throat and breast; so also has an adult male from Ushant, dated 22nd September 1933. Both are in the Meinertzhagen Collection, and the latter was selected by Clancey as a co-type of his Breton race *ponens*.

MOVEMENTS OF ROCK PIPITS

As indicated, the northern Rock Pipits are migratory, *littoralis* strongly so, many travelling to northern and western France. A bird ringed at Revtagen, southern Norway, on 22nd September 1952 was shot on 7th March 1954 at Mortagne in Gironde; but some apparently winter much nearer home, since one marked at Fjell, Hordaland, Norway, was recovered at Anstruther in Fife on 2nd January 1961. An autumn migrant ringed at Mellum, East Frisian Islands, on 1st October 1960, was at Cliffe, Kent, in February 1962. A bird ringed at Seahouses, Northumberland, on 3rd January 1962, and recovered on board a ship north of the Faeroe Islands on 9th May in the same year, may have been a drift-migrant *littoralis*; but equally it is possible that it was a late-returning example of the Faeroese *kleinschmidti*.

Birds which I cannot separate from *kleinschmidti* occur in winter and early spring at least as far south as Tarbatness on the east coast of Scotland, the Clyde and Ayrshire on the west coast, and in the west of Ireland. The only recoveries of this form are of birds, mainly juveniles, ringed by the Fair Isle Bird Observatory: these show movement to Stronsay, Orkney (40 miles south-west, late November); Canisbay near Duncansby Head, Caithness (80 miles south-west, late January); Wick, Caithness (120 miles SSW, December); Macduff, Banffshire (132 miles SSW, January) and Buchanness near Peterhead, Aberdeenshire (150 miles south, mid-April). Another Fair Isle juvenile was reported to have alighted on a trawler 60 miles south-west of the island about 1st April 1956; and there is one foreign recovery, a juvenile ringed on 3rd July 1956 and found at Den Helder, Noord-Holland, on 10th March 1958. These recoveries suggest that autumn movement of *kleinschmidti* southwards into the range of *petrosus* is not unusual among Shetland birds, though crossings of the North Sea are probably rare. Nothing is known about the Faeroe Islands stock from ringing, but it is worth mentioning that Venables (1939) recorded 'assisted passage' of one bird to Orkney.

Such St. Kilda birds as I have examined critically were collected in autumn and are not separable from *kleinschmidti*; no breeding birds are available for comparison with other forms, but when there in 1957 my impression was that *kleinschmidti* and not *meinertzhageni* is the breeding form. One juvenile ringed on 28th August in that year was recovered the following February in Benbecula, 50 miles ESE. I have examined spring specimens of *kleinschmidti* from Lochboisdale, South Uist, collected along with local *meinertzhageni*.

The recoveries of birds ringed within the range of *petrosus*—except for that at Seahouses, mentioned above—show very little movement. Isle of May breeders have been recovered in Fife at Craill (six miles west), Elie (ten miles west) and St. Andrews (14 miles north-west), and there is one from the North Carr Lightship (eight miles north). The only other movements of note are from Pram Sands to Falmouth in Cornwall (13 miles ENE), Great Saltee to Dungarvan, Co. Waterford (45 miles west), and Beadnell, Northumberland, to Burnmouth, Berwickshire (25 miles north-west).

Birds which are sometimes identified as Water Pipits, sometimes as Scandinavian Rock Pipits, are not infrequent spring visitors to parts of the south and east. Numbers were recorded in 1958 and 1959 from Somerset east to Sussex and Essex, with records in Norfolk and Lincolnshire, and in 1959 the movement was most noticeable between 22nd March and the end of the month, there being a peak of a dozen birds at Chew Valley Reservoir, Somerset, on 29th (*Brit. Birds*, 52: 176). These occurrences fall along the return migration route of *littoralis* and seem more likely to belong to that race than to *A. s. spinoletta*. (There

was, incidentally, an unusual autumn passage of this species at Dungeness, Kent, in 1958, between 12th October and 14th November, with 15 on 19th October and 20 on 7th November; usually only single or very few birds are involved in autumn.) I have seen north-bound passage of *littoralis* at Monks' House on the Northumberland coast in late March, but the form is extremely rare as a spring migrant at Fair Isle and Shetland.

The ringing records given above are taken mainly from the 'Report on bird-ringing' by Robert Spencer and 'Recoveries in Great Britain and Ireland of birds ringed abroad' by Miss E. P. Leach, for the appropriate year, published as a supplement to *British Birds* in each case.

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SUMMARY

An outline is given of the divergence of opinion in recent years on the racial groupings within *A. spinoletta*. The key to subspeciation is the geographical variation in the pre-nuptial moult. This, though individually variable in extent within all populations, is of a different kind in different areas, resulting in a distinctive dress in some, but in a new plumage much like the winter dress in others.

On the basis of a comparison of spring material the races recognised in this study are *A. s. spinoletta* (alpine Europe), *A. s. littoralis* (Scandinavia), *A. s. meinertzhageni* (Outer Hebrides), *A. s. petrosus* (north-west France, England, Wales, Ireland, and most of Scotland), and *A. s. kleinschmidti* (northern isles of Scotland and Faeroe Islands). Comments on these races and the difficulties of segregation, especially of migrants, are given.

The post-nuptial and pre-nuptial moults are described in detail, and movements of the various races of Rock Pipit are discussed, mainly in the light of ringing recoveries.

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Studies of less familiar birds

138. Great Snipe

Text and photographs by P. O. Swanberg

(Plates 72-79)

FIELD-CHARACTERS

THE GREAT SNIPE *Gallinago media* is decidedly larger than the Snipe *G. gallinago*. Kolthoff (1896) found that it ranged in weight from 140 grams in thin specimens to 213 grams in a very fat one, while Snipe averaged only 120 grams; Niethammer (1942) quoted even lower figures for the latter species, 13 specimens of which (mostly collected in April) ranged from 86 to 121 grams. Further, Jägerskiöld and Kolthoff (1911-26) gave the wing-measurement of the Great Snipe as 138-152 mm., and that of the Snipe as only 124-135 mm.

Size alone is of limited value in the field, however, and one of the two most important field-characters is that the Great Snipe is more boldly spotted on the breast than the Snipe, and barred all over the flanks and the tibiae so that only a small area in the centre of the belly looks more or less unspotted (plates 72, 73 and 74). In the Snipe the pure white of the belly extends to the lower parts of the flanks and the tibiae (*cf.* the photograph by C. C. Doncaster, *Brit. Birds,* 53: plate 27a).

The second main field-character is the triangular white on the outer tail, which may be seen when the tail is fanned. The three outermost feathers on each side are largely white and the next two are broadly tipped with white (plates 75 and 76). Sometimes this may be seen when a Great Snipe flies up, and more often when it lands: after a

PLATE 72. Great Snipe *Gallinago media* at display stand, Swedish Lapland, 23.15 hours, 22nd June 1961. This male is preparing for the more spectacular postures, making a low bubbling noise, *[illegible]* . . . , which is not audible at more than a few yards. Sometimes he may jump into the air from this posture, alight only two or three feet away and then go on 'bubbling'. The twittering described on plate 73 may also be used for a while as an introduction to the full display. Compare the boldly spotted and barred under parts (only the very centre of the belly is almost clean) with those of the Snipe *G. gallinago*, which are much less heavily marked (see, for example, *Brit. Birds*, 53: plate 27a, pages 504-508) (*photo: P. O. Swanberg*)

PLATE 73. Great Snipe *Gallinago media* starting display, Swedish Lapland, 21.52 hours, 18th June 1961. The male begins the display proper by rising on his toes, stretching his neck, pointing his bill slightly upwards and also raising his tail stiffly. A moment later he lifts his body in a peculiar upright position, straining his breast upwards and forwards so that his neck again seems drawn in and his chin seems to be resting on his breast. With open bill he produces a twittering call, *bipp-bipp-bippbippbipp* . . . , and this runs into a clicking or drumming sound, *klu-kee kekekekeke* . . . , stressed at the third syllable and then decreasing, which is the culmination of the display. This photo was taken at the moment when the drumming sound began. Note the vibrating flanks and wings (*photo: P. O. Swanberg*)

PLATE 74. Great Snipe *Gallinago media* uttering the drumming or clicking sound, Swedish Lapland, 21.08 hours, 18th June 1961. Observe the vibration of his upper mandible. This is the noise that reveals the display at a distance. When it is not especially close it may be compared with the kind of sound that one produces by drawing one's finger along a horn comb. Under good conditions it can be heard by an experienced observer at a distance of 200–250 yards (*photo: P. O. Swanberg*)

PLATE 75. Great Snipe *Gallinago media* during later stages of display, Swedish Lapland, 21.49 hours, 18th June 1961. The clicking or drumming sound develops into a vibratory, whizzing call which fades off at the end. In passing from the clicking to the whizzing he spreads his wings once or twice, fans his tail and displays the white of his outer tail-feathers. This photo shows such a moment, seen from behind, when his bill is still wide open (the twitching upper mandible is just visible here). Note the conspicuously striped wings (*photo: P. O. Swanberg*)

PLATE 76. Great Snipe *Gallinago media* display, Swedish Lapland, 21.51 hours, 17th June 1961. At the moment when the male fans his tail, he keeps it more or less horizontal; then he depresses it, still forming a conspicuous white signal. He droops his body simultaneously, while keeping his head in the same position in relation to the ground, with the result that his neck is again stretched but for a moment still puffed up as the whizzing sound ends. This photo was taken just then. Note that the three outer tail feathers are mainly white and that the next two have white tips. Great Snipe also show these white triangles when they jump into the air at the 'lek' or when they drop down to cover (*photo: P. O. Swanberg*)

PLATE 77. Above, Great Snipe *Gallinago media* at end of display, Swedish Lapland, 21.53 hours, 18th June 1961. When he has completed all the different postures and sounds, he closes his tail and, within a few seconds, is quite relaxed for a moment or for some while before this chain of display actions begins again. Note the two light wing-bars bordering the black speculum. Left, showing length of bill in relation to head: it is shorter and slightly stouter than that of the Snipe *G. gallinago* (*cf. Brit. Birds*, 53: plate 27a; and 55: plate 82) (*photos: P. O. Swanberg*)

PLATE 78. Great Snipe *Gallinago media* when display is over, Swedish Lapland, 02.52 hours, 23rd June 1961. Near the Arctic Circle the inclination to display fades one or two hours after midnight. The male, still at his tussock, relaxes and puts his beak into his feathers, but the display impulse may not have entirely disappeared. Sometimes a low-voiced bubbling or twittering may be heard from him in this position, or a neighbour's drumming may suddenly cause a further outburst even though he seems relaxed: he becomes active again, rises on his toes, raises his breast and starts the drumming call. When the display impulse has faded finally, he begins feeding, probing the soil on his display ground. This photo was taken at such a moment; note the mud on his bill (*photo: P. O. Swanberg*)

PLATE 70. Display ground of 12-15 male Great Snipe *Gallinago media*. Swedish Lapland, June 1961. Just south of the Arctic Circle, 2,500 feet

flight it tends to drop vertically into dense vegetation such as willow scrub and the white then usually shows quite clearly when the tail is spread as a brake. When the bird is seen with a strong light behind it, the white of the tail stands right out. It should be remembered, however, that juveniles do not fully develop this white until after the moult in their first autumn. Incidentally, Great Snipe usually have 16 tail-feathers compared with the normal 14 of the Snipe, but both species are variable in this respect.

The flight of the Great Snipe is straight, not zigzagging or swaying. This species looks heavier than a Snipe when it is flushed, giving an impression of a small Woodcock *Scolopax rusticola*, and it is usually silent. Its wing-beats do not seem so rapid as those of a Snipe. Seen from behind in level flight just over the top of the willow scrub, one of these birds has sometimes given me the impression of a Teal *Anas crecca*. In flight the bill is depressed to about 15° to 20° below the horizontal. In a good light the back looks not merely striped like that of a Snipe, but bright greenish contrasting with dark brown streaks. A black speculum bordered by the white tips of the wing-coverts and secondaries is usually conspicuous in flight and often striking on the ground (plates 75 and 77). When a Great Snipe is running through dense vegetation it holds its bill almost horizontal; otherwise the tip is slightly depressed.

DISTRIBUTION AND HABITAT

The Great Snipe is known to breed in northern Scandinavia, Russia, northern Poland and western Siberia eastwards to the Yenisei. Up to a hundred years ago it was also numerous in suitable localities in southern and central Sweden. In the marshes around Lake Hornborga, for example, it used to occur in great numbers in the breeding season as well as in the autumn: Kolthoff (1896) wrote that in 1864 two hunters could easily shoot a hundred there in two days and thousands would still be left. Then, however, a rapid decrease began and in the last fifty years the species has nested only occasionally in central Sweden and only solitary individuals are infrequently observed there on migration. Such nesting as there is now in Sweden is restricted to a few places in the north. A similar decrease has occurred in other countries.* In Russia, for instance, Alexejev (1956) quoted M. A. Menzbir as concluding that the decrease started at the beginning of the nineteenth century and added that the species is now a rare bird in many areas. This great decrease throughout the range has not been clearly

*In Britain the Great Snipe used to be regarded as a scarce but regular passage-migrant, but, in spite of the great post-war increase in observation, the seven years 1958-64 produced only ten records. Curiously, no less than five of these were in the winter period December-February and at least one stayed for eight weeks in those months (*Brit. Birds*, 57: 268).—Eds.

explained, but hunting and drainage are probably the most important factors. It is sometimes thought that climatic changes may have played a part, but, if the decline in the nineteenth century were related to the decreasing spring and summer temperatures at that time, why was there not a corresponding recovery when the temperatures increased again this century, and why should the remaining strongholds now be in the cooler northern parts of the range?

Plates 72-79 were taken in central Swedish Lapland, in a valley above the tree limit where some tens of Great Snipe still breed in the willow zone. This valley is only slightly south of the Arctic Circle and so the light of the midnight sun just below the horizon makes all-night observation possible. This and the few other remaining breeding localities in Sweden correspond well with those described in earlier accounts when the species was said to breed everywhere that the habitat was suitable. The Great Snipe frequents vast marshy grounds with sphagnum-covered tussocks and willow scrub, usually fed by numerous tiny streams from the mountain slopes above (plate 79). A considerable area of such marshy ground may be essential for this species, since it is apparently highly stimulated by, if not dependent on, a social display.

The display area is in the wetter part of the marshy area, but, in contrast to the Snipe *G. gallinago*, the Great Snipe prefers drier ground for its nest and this tends to be fairly well concealed by dense herbs and willows (see *Brit. Birds,* 42: plates 33-35). On migration—that is in late August and the first two weeks of September in central Sweden—it is found in the same sedgy marshes as the Snipe, and it also occurs in drier meadows.

DISPLAY

Male Great Snipe congregate on a communal display ground each evening, just as Ruffs *Philomachus pugnax* do by day. In the mountain valley in Swedish Lapland where these photographs were taken, there are two known display grounds just over three miles apart. In 1961 one had 15-20 males and the other 12-15 in areas of about 65×75 and 50×65 yards respectively. Occasional display sounds may be heard far from the communal display ground in the daytime, but these do not indicate full display or a true display ground. On the contrary, they show that by day the males are spread well away from the display area.

Every male has several display stands on the communal ground and he alternates between them, usually running from one to another, but one spot generally seems to be the favourite. The postures and the accompanying sounds are described in the legends accompanying plates 72-78.

When the action reaches maximum intensity, the displaying snipe

frequently jump five to eight feet in the air. These jumps either end at the starting point or move a bird a few yards to another stand on a different tussock. Now and again two birds jump vertically into the air together, breast to breast and bill to bill; loud wing-beats can be heard at these times, but I would not like to say that this is a real and intentional 'striking with wings' as suggested in *The Handbook*. After this ceremonial caper they usually sit peacefully near each other, sometimes at a distance of only a foot or two. More serious aggressive display may possibly occur and gentle chasing certainly does take place on occasion, but I have never seen two birds strike each other with their bills or anything else to suggest this. For example, at 00.57 hours on 23rd June 1961 two were 'fighting' close to my hide. They wielded their bills horizontally like spears, but, as usual, there was no real attacking in the air or on the ground, only fluttering breast to breast. It ended with their both dropping down only a foot apart; then one ran off about five feet and both began the drumming which is the culmination of the display (and which from a distance, as described on plates 73 and 74, sounds like a series of clicking noises).

The social character of the display is also shown by several birds taking short flights together over the scrub on the display ground when display is at its maximum. Two to four may take wing for 10 to 20 yards or more and then alight a short distance from each other. Sometimes one of these will break away from the others in flight and disappear to drier ground near-by: I suspect that this may be a female. Another interesting pattern in the communal display is when, after a lull, one bird begins drumming and this causes other males to start up in rapid succession. The drumming or clicking sounds thus spread like a wave over the display ground and one may then easily get the impression that the snipe have purposely stationed themselves in a long line (see *The Handbook*), but in my experience they are actually dispersed irregularly where there happen to be suitable display stands.

It is remarkably difficult to discover a display ground if one does not know its position in advance. One reason is that the males from a vast marshy area gather to a very limited part where they are fairly well concealed by scrub. Another is that the sounds carry only a short distance—as little as a hundred yards in bad weather against the wind and only 200-250 yards (or slightly more for very good ears) in the best conditions. Yet another reason may be that the full communal display lasts for only a few hours around midnight in northern Scandinavia or at dawn and dusk further south. In June there is fairly good daylight all the night in northern Sweden, as is demonstrated by the fact that all the photographs on plates 72-78 were taken without artificial illumination. At midnight photographs could still be taken at f5.6 and 1/25th second, even with an overcast sky.

As Collett (1893) pointed out, the males are not usually seen at or

around the display ground before the display hours, nor are they normally seen to arrive or leave. On 18th June 1961, for example, I reached the display ground at 13.45 hours. No Great Snipe were in evidence. I watched the whole area continuously from my hide on the outer edge, but did not see any flying snipe arrive. Nevertheless, the display began about 30 yards from my hide at 17.15 hours and soon 15-20 males were involved. After the lek begins, the display flights already described may be seen now and then, but I myself have not observed the 'arrival of birds flying low with a special slow wing-action and producing a quite loud "wuff, wuff, wuff", with wings' ascribed to R. Rohweder in *The Handbook*. Evidently they *usually* run to the display ground and leave it in the same way, but further critical observations are still needed.

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Notes

The feeding range of Shags.—Feeding movements by sea-birds are difficult to measure as they often take the form of a seaward or coastwise spread. Occasionally, however, when the feeding area is separated from the roost by obviously unsuitable water, definite movements can be measured. While working at sea in Cardigan Bay during 10th-12th August 1965, I noticed an example of such a movement of Shags *Phalacrocorax aristotelis*. These birds were frequently flying between the southern headlands of the Lleyn Peninsula, Caernarvonshire, and the shoals of Sarn Badrig, a distance of about eight miles.

Sarn Badrig is the largest and most northerly of the three submarine ridges which are a peculiar feature of Cardigan Bay. It extends for about eleven miles from the coast near Mochras, Merionethshire, and lies roughly parallel to the Lleyn at a distance of seven to ten miles from the Lleyn coast. The sarn stands about five fathoms above the surrounding sea-bed. Parts of it are exposed at spring tides, but most of the crest is between a quarter and two fathoms below chart datum. It consists mainly of large stable boulders with a rich weed

cover and seems eminently suitable as a Shag feeding area. However, there is nowhere near the outer end of the sarn where the birds can roost out of the water. A prominent roost near Trywyn Cilan, Caernarvonshire, towards which the birds were heading, was used at the time by more than 50 Shags. Between Sarn Badrig and the Lleyn coast the sea bed is mainly muddy sand with some patches of stones and gravel at depths of eight to 20 fathoms. E. I. S. REES

Feeding habits of Cattle Egrets.—It is well known that Cattle Egrets *Ardeola ibis* regularly associate with large mammals, feeding on the insects and small frogs disturbed by their movements. In several of the East African game-areas I have observed Cattle Egrets using my Land Rover for the same purpose, bolder individuals coming to within a foot or so of the wheels to snatch up disturbed insects. As yet, however, I have not seen them riding on cars as they do on buffalo and elephants.

On 11th-13th July 1965, by the receding flood waters of the Wembere river in Tanzania, I noted a rather different association. Scattered along the edge of the floods were temporary camps of people catching and drying fish. Around such camps there are always large amounts of rotting fish remains, especially heads and backbones from which most of the flesh has been filleted. These regularly attract such typical scavengers as Marabou Storks *Leptoptilos crumeniferus*, Black Kites *Milvus migrans* and Grey-headed Gulls *Larus cirrocephalus*. At several of the camps during this period, however, I was surprised to observe small numbers of Cattle Egrets among these other birds. As far as I could see, the egrets were not feeding on bits of flesh left on the bones, but on flies attracted by the rotting fish.

JOHN REYNOLDS

Juvenile Moorhen feeding on dead gull.—On 6th August 1965 I was watching from a hide at the North Pond on Skomer Island, Pembrokeshire, when a young Moorhen *Gallinula chloropus* emerged from the reeds and began feeding in the mud. After a few minutes it turned its attention to the dry and shrivelled corpse of a gull *Larus sp.* which was lying near-by and pecked at it with evident relish for four or five minutes. It then moved away about three yards and pecked in the mud again until a young Carrion Crow *Corvus corone* alighted at the carcase and started feeding on it, whereupon the Moorhen rushed at it, drove it off and resumed feeding on the carcase itself. When I examined the gull afterwards I saw no sign of insects or other invertebrates on which the Moorhen might alternatively have been feeding.

R. E. SAUNDERS

[Derek Goodwin comments that he has seen Coots *Fulica atra* feeding on dead gulls in winter.—EDS.]

Snipe alighting on surface of deep water.—On two separate occasions in October 1964 two colleagues of mine, P. Gallagher and G. Dismore, saw a Snipe *Gallinago gallinago* alight on the surface of a large flooded gravel-pit at Iver, Buckinghamshire. In each case it remained on the water for a few seconds with wings outstretched before taking off again; neither looked sick or injured and both flew strongly. The places where they (or perhaps it was the same bird on each occasion) alighted were approximately 20 yards out from the bank and I later found the depth there to be 15 feet; there was no question, therefore, of the Snipe misjudging the bottom in water which was just too deep. D. R. Rose

Lesser Black-backed Gulls fishing regularly for Eels.—Although *The Handbook* records several species of gulls fishing, relatively little has been published on the habit. Over the past few years, and more especially in recent months, we have made a number of observations on Lesser Black-backed Gulls *Larus fuscus* fishing for Eels *Anguilla anguilla* at Leighton Moss, Lancashire. The Eels are usually six to nine inches long. Up to four gulls may fish at any one time over the largest pool; other Lesser Black-backed Gulls are often present, but do not try to catch Eels. The fishing gulls are very pugnacious and will often chase each other as well as non-fishing gulls and fishing Herons *Ardea cinerea*.

The actual capture of an Eel is quite interesting. The gull flies slowly over the pool at a height of ten to 25 feet. Upon sighting an Eel, it checks in flight and hovers at a height of up to eight feet before plunging into the water, though without submerging completely. If it captures an Eel, it rises from the water and may fly high and straight to the nearest grass-field where it can eat the fish; if the Eel drops into the field it can then easily be recaptured. Other gulls, however, on capturing an Eel, fly off over the water and settle there to eat it.

Actual capture does not necessarily mean that the Eel will be retained and eaten. Often, especially when an Eel is caught by its posterior region, it escapes by wriggling free whilst the gull is still in the water. Sometimes, too, the Eel winds itself around the gull's bill or neck; this seems to alarm the gull and the Eel is then dropped. When the Eel is caught by the head or neck, however, success is almost sure. Possibly in such cases the Eel is killed or paralysed as a result of injury to the brain, gill filaments or major blood vessels. This has certainly happened with some Eels caught by Herons. However, if an Eel is dropped when a gull is flying high it is usually recaptured in flight. After each capture, the gull always washes its bill.

The success of these Lesser Black-backed Gulls is somewhat dependent upon the weather conditions. They are more successful on fine days, especially when it is very hot and there is no water movement.

Then the Eels bask near the water surface and can be clearly seen. In these ideal conditions up to 70% of the attempted captures have been successful. On more windy days, however, especially when rain is disturbing the water, success is generally smaller. On 15th June 1965, in conditions of light rain and wind, all of 39 attempts made in four hours were unsuccessful. This is the most unsuccessful spell of fishing we have recorded by this species. Over long periods of observation in these adverse conditions between 10% and 30% of attempts may be successful. J. WILSON and M. GREENHALGH

House Martins apparently taking insects from ground.—During damp weather at the beginning of July 1965, the grass on our lawn at Pitlochry, Perthshire, grew rather long and one day I noticed that several House Martins *Delichon urbica* were flying very low over it. Now and again one would come down, appear to 'run' along the grass a short way and then peck as if picking up one of the many insects which were also attracting a family of Pied Wagtails *Motacilla alba;* it would then fly up and away again. House Martins were likewise flying very low over an adjacent hayfield, but I did not see any land there. I have occasionally seen House Martins on the ground in the garden before—once, for example, there were three down at the back of the house on a mossy and grass-grown path just below where there was a nest—but this is the first time that I have seen them apparently feeding there. I should perhaps add that there was no question of their picking up mud for nest-building. E. M. TREVOR

Rooks somersaulting on wires as a display.—Several notes have already been published on the subject of Rooks *Corvus frugilegus* somersaulting on wires or hanging upside down (*Brit. Birds*, 54: 121-122; 57: 182-183 and 329). I have recently watched this three times in Lancashire and my observations on the last occasion, on the Inner Ribble Marshes on 23rd September 1965, seem to have something to add to what has gone before.

That day two adult Rooks were perched about four feet apart on high tension wires some eighty feet above a field in which about thirty other Rooks were feeding. They leant well forward with heads and necks stretched, tails spread and wings half open. Often, they almost flopped over but returned to the normal perching posture and looked at each other, calling loudly. Eventually one went right over, maintaining its position by holding on with its feet and so resembling a large bat. The other then stretched out its neck, bobbed its head and called, whereupon the first one swung upright, somersaulted again and finally attacked the other fiercely, driving it away. M. GREENHALGH

Song Thrush living with twig through its body.—On 13th August 1965, in our garden at Eastbourne, Sussex, my wife was feeding the

birds when she noticed, to her consternation, that one, a juvenile Song Thrush *Turdus philomelos*, had been transfixed by a stiletto-like twig several inches long. Perhaps this had happened when it alighted in a bush or tree as it had evidently been pierced from below: the thickest part of the twig showed between its legs and the sharper end protruded from the middle of its back. One leg appeared to be out of action, causing it to hop and perch on the other one alone, and, as a result, it had some difficulty in picking up food. However, it was otherwise able to get about quite well and it flew down at regular intervals to take the cheese she put out; at times it rested on a garden seat in such a way that the bottom of the twig went between the slats. Nevertheless, its condition deteriorated noticeably in the following week.

On 20th August we contacted D. D. Harber, who came at once to our garden and set up a mist-net in which the injured thrush was later caught. We removed the twig, not without some difficulty, and afterwards released the bird. It settled on a fence and looked quite dazed, but later flew off. It came back early the next morning and from then on there was little disruption in its routine. It continued to come for cheese regularly and apparently made a good recovery from the injury and from the shock of having the twig removed. By the end of August it was adopting a bellicose attitude towards other Song Thrushes encroaching on its territory; it disappeared in early October and then returned in mid-November, recognisable by a white patch where the twig had been.

The sharp point of the twig was accidentally broken off, but Mr. Harber took the main piece away and measured it. It was $5\frac{1}{2}$ inches long and, of this, $1\frac{1}{4}$ inches protruded beneath the bird's belly and $2\frac{3}{4}$ inches stuck out of its back (allowing for the bit broken off, this means that probably about 4 inches originally protruded above); the stick was 5 mm. wide at the thick end and 4 mm. where it was broken off. It seemed remarkable that the bird could have lived and moved about after being transfixed in this way. The happy sequel gave my wife and me great satisfaction as we had fed the parent Song Thrushes and their successive broods throughout the year.

URVINE W. PUGH

[This is a most interesting observation, but by no means unique. One of the most extraordinary cases of this kind involved a male American Robin *T. migratorius* in New Jersey, U.S.A., which was similarly transfixed by a straight twig some three-sixteenths of an inch in diameter and projecting about one inch below his breast and two inches above his back; this bird helped his mate to rear two broods, taking a normal part in feeding the young and protecting his territory, and then reappeared some two years later, still transfixed, though the stick seemed by then to be a little shorter and frayed at the ends (Charles K. Nichols, *Auk*, 61: 466-467). In mentioning this case,

Frank W. Lane (*Animal Wonderland*, revised edition 1962), went on to refer to records of White Storks *Ciconia ciconia* and a Honey Buzzard *Pernis apivorus* in Germany and Finland respectively with arrows of African origin through neck or wing; he also published a photograph of a Mute Swan *Cygnus olor* which led quite a normal life in spite of having a long aluminium arrow through its neck.—EDS.]

Song Thrush taking lizard.—*The Handbook* mentions that the Song Thrush *Turdus philomelos* has been seen 'to attack lizard and swallow its tail'. The following variation on this might be of interest.

On 8th August 1965, on a narrow tarred road at Aberystwyth, Cardiganshire, I saw a Song Thrush with the detached tail of a Common Lizard *Lacerta vivipara* in its beak and shaking it from side to side. As I approached, it dropped the tail and picked up the lizard itself, which was a few feet away and running towards the roadside bank. It flew into the drive of a garden near-by, where I watched it through binoculars for about five minutes while it pecked at, shook and thumped the lizard on the ground. Finally, when the lizard was apparently dead, though still in one piece, it flew away out of sight with it in its beak.

A. O. CHATER

Blackbird killing small mammals and a fledgling bird.—The recent note by Miss Kathleen M. Hollick on a Blackbird *Turdus merula* carrying off a shrew *Sorex sp.* (*Brit. Birds*, 58: 439) recalled to mind a record in the *Essex Bird Report, 1962* (p. 35). At Rayne, near Braintree, Essex, in June 1962, K. J. Adams saw a female Blackbird kill and feed her single fledged youngster 'with a young shrew, a full-grown House Mouse *Mus musculus* and a fledgling House Sparrow *Passer domesticus*'.

BRIAN S. MEADOWS

Woodchat Shrikes in 1964: a correction.—A Woodchat Shrike *Lanius senator* on Salthouse Heath, Norfolk, on 23rd May 1964 was wrongly included on page 368 of the 'Report on rare birds in Great Britain in 1964' (*Brit. Birds,* 58: 353-372). In fact, the Rarities Committee was unable to accept this identification and this was actually stated on page 372. I wish to apologise to the observer and to the county recorder for this mistake and for any confusion it has caused.

D. D. HARBER

Red-tailed Shrike in Co. Cork.—On 9th October 1962 we came across an immature shrike *Lanius sp.* in a patch of brambles in Comillane, the north-eastern part of Cape Clear Island, Co. Cork. Earlier in the day, in another part of the island, we had been watching an immature Red-backed Shrike *L. collurio* which had arrived on 2nd October. The new bird was very similar and at first we took it to be another Red-backed, until we saw that the tail and rump were bright

chestnut—almost as bright as the tail of a Redstart *Phoenicurus phoenicurus*. It also differed in having rather paler under-parts, a greyer head, more buff-coloured wing-coverts and much less uniform wings, while there was no white on the outer tail-feathers and off-white bases to the primaries produced a fairly conspicuous wing-bar. We realised that the bird must be one of the group of Isabelline or Red-tailed Shrikes, now regarded as races of *collurio*. We watched the bird for an hour and a half at ranges down to 30 yards with binoculars and a telescope on ×25 and ×40. It was still in the same area on the following day, the 10th, but was not found when Comillane was next visited on the 12th. It may be relevant to note that the Red-backed Shrike was last seen on the 11th.

The following summarised description is based on our independent field-notes:

Size, shape and actions: as Red-backed, but perhaps slightly shyer. *Upper-parts:* forehead and line over eye pale greyish-buff; ear-coverts dark brown, sometimes appearing blackish, sometimes more rufous; narrow creamy orbital ring, complete except in front of eye; crown greyish-brown, slightly barred; nape and mantle pale rufous-brown, feathers tipped dark brown giving barred effect; scapulars and lower back paler than mantle; rump and tail uniform, clear bright chestnut-red, brighter than tail of Nightingale *Luscinia megarhynchos* and almost as bright as tail of Redstart; no white on outer tail-feathers; wing-coverts very broadly tipped buff and looking almost entirely buff in spite of dark brown bases; primaries dark brown or blackish-brown, edged buff, off-white bases giving fairly conspicuous wing-bar; secondaries brown, broadly edged cinnamon-buff, slightly tipped greyish (tips of inner webs blackish). *Under-parts:* chin, throat, breast, belly and under tail-coverts off-white; sides of throat slightly barred (but unbarred immediately below ear-coverts); flanks slightly greyer and barred. *Soft parts:* eye dark; upper mandible dark brown with black tip, lower mandible grey with black tip; legs and feet black.

Although not conclusive, an examination of skins in the British Museum suggested that the bird was probably *L. c. phoenicuroides*. In fact, this is the race most likely to occur in Britain and Ireland, as pointed out by Peter Davis in recording the Fair Isle example (*Brit. Birds*, 54: 209-210).

Although it was first seen on 9th October, there was almost certainly no arrival of migrants that day, in spite of the fact that a new Red-breasted Flycatcher *Muscicapa parva* was found. Since Comillane had not been visited since the 6th, it is likely that the shrike had arrived on the 8th, when there had been a small fall including Chiffchaffs *Phylloscopus collybita*, Pied Flycatchers *M. hypoleuca*, Blackcaps *Sylvia atricapilla*, Redstarts, Firecrests *Regulus ignicapillus* and a Greenish Warbler *P. trochiloides*.

This is the first record of a Red-tailed Shrike in Ireland and the fifth in Britain and Ireland together. It might also be noted that the Red-backed Shrike was only the eighteenth Irish record.

J. T. R. SHARROCK and M. P. L. FOGDEN

Reviews

Enjoying Ornithology. By David Lack. Illustrated by Robert Gillmor. Methuen, London, 1965. 264 pages; 3 black-and-white plates; many line-drawings. 30s.

Discussing how the scientific repute of ornithology declined in Britain during the early part of this century, Dr. Lack relates how the number of Fellows of the Royal Society who were also members of the British Ornithologists' Union fell from 17 in 1899 to one in 1939. The sharp and encouraging reversal which has occurred since that time owes so much to the achievements of David Lack that it comes as a surprise to read that for only 19 of his 36 years of studying birds has he worked as a professional. He rightly points out that the reversal occurred when the study of living birds in their natural surroundings was joined to the discipline of the trained scientists, and this book admirably exemplifies these two aspects—his continuing delight in wild birds and his rigorous thinking.

This is a collection of talks and articles written for enjoyment and intended for those with a general interest in natural history. The first and largest section is devoted to migration, gathering conveniently together many of the new insights provided by the use of radar; then, after an interlude on Swifts, there are two groups of essays on British ornithologists and Darwinian evolution, and the whole is rounded off with five ornithological entertainments. Readable, stimulating and engaging, they reflect almost the full range of Dr. Lack's wide interests; the two most obvious gaps are his famous field studies of the Robin, carried out while still an amateur, and his first professional pre-occupation, the problems of bird populations. For these one must go to his books, and it is to be hoped that these appetising *hors d'oeuvres* will encourage many to do so.

The book is adorned delightfully by the drawings of Robert Gillmor, and Dr. Lack has most generously allocated all royalties to the Royal Society for the Protection of Birds. STANLEY CRAMP

Instructions to Young Ornithologists. VI. Domestic Birds. By Derek Goodwin. Museum Press, London, 1965. 141 pages; 16 black-and-white photographs; 23 text-figures. 15s.

With his wide knowledge of both wild and aviary birds, Derek Goodwin is eminently suited to write on the present subject and this well-written and quietly authoritative book can be strongly recommended to those interested in all kinds of birds and their behaviour. The author amply justifies his opinion that domestic birds are 'as interesting as wild ones' and succeeds in his aim of presenting 'information about all the

species of birds that man has domesticated, the uses to which he has put them, their behaviour, and the extent to which they have varied under domestication, and the wild species from which they have originated.'

In the general section, the author first clearly defines his terms (domestic/domesticated, wild, species, race/subspecies, colour phases, variety, breed, bird-fancier, aviculturalist) and then examines the motives that first made people keep birds and the origins of domestic species. He goes on to compare domestic and wild species, with severe strictures about some of the monstrosities produced by bird-fanciers, and discusses the characters that fit species for domestication, with special reference to the 'pre-adaptations' of the wild ancestors.

Most of the book is devoted to individual essays of varying length on 18 domestic species (four waterfowl, five game-birds, three pigeons, a parrot, four passerines and a cormorant), illustrated by the author's own characteristic sketches. Each essay is informative and tends to have its own theme, and the great risks of this sort of presentation—repetition and monotony—are skilfully avoided. I particularly liked the treatments of the Domestic Goose, Domestic Duck, Chicken, Barbary Dove, Domestic Pigeon, Diamond Dove, Budgerigar, Canary, Zebra Finch and Java Sparrow. The information on pigeons usefully supplements that in the author's earlier book in the same series—*Bird Behaviour* (1961)—and makes one look forward to his monograph of the Columbidae now in preparation.

K. E. L. Simmons

Letters

'The original misidentification of the Hampshire Cetti's Warbler'

Sirs,—The letter from R. H. Charlwood and D. D. Harber (*Brit. Birds*, 58: 225-227) contains a garbled account of what happened at Titchfield Haven, Hampshire, in connection with the identification of the Cetti's Warbler *Cettia cetti* which I discovered there on 4th March 1961. It is only fair to the many other observers accused of being the victims of mass hallucination that the truth should be known, which is as follows.

I personally and alone discovered this bird and heard it sing many times before it showed itself several days later. None of the observers criticised by R.H.C. and D.D.H. saw it clearly enough or long enough to describe its appearance accurately before it was caught in a mist-net. There was never any misidentification; the mist-net was used because the bird had not been satisfactorily identified.

I got my first comparatively good but inadequate view of the bird on 7th March, but it was certainly not seen 'properly' as R.H.C. and

D.D.H. allege. Two other observers at that early stage thought that it was a Cetti's Warbler, but they had no idea of what a Cetti's Warbler's song was like, whereas I had read in *The Handbook* that it consisted of a 'sudden, brief outburst (1-3 secs.) of loud, clear notes, "chee, che*wee*-che*wee*-che*wee*, chew-ee" or "chee, che*wee*choo-*wee*choo-*wee*choo-wee," with other minor variants. . . .' Since at that time the Titchfield Haven bird never once made such an utterance, but poured forth a rich, fruity song whose tone reminded me of a Blackcap *Sylvia atricapilla* and a Nightingale *Luscinia megarhynchos*, I could not accept then the identification of Cetti's Warbler. The song consisted of various short phrases always introduced by a double phrase *chew-to-it, chew-to-it* and repeated at intervals of two to three minutes when the bird was singing. Typical short phrases sounded like *is it safe? is it safe? is it? is it? see what you mean, see what you mean.* The structure of the song therefore somewhat resembled that of a Song Thrush *Turdus philomelos*.

When fifteen observers had failed to identify the bird, I telephoned I. J. Ferguson-Lees and reported that I had found what I thought was a Moustached Warbler *Lusciniola melanopogon* because the song differed so much from that of the Cetti's Warbler as given in *The Handbook*. I added that none of the observers (including myself) had yet seen the bird well enough to identify it, and I asked for help because none of us had ever seen either warbler before.

As a result of this request, R. H. Charlwood telephoned me from Sussex on 15th March to say that he proposed to bring D. D. Harber and G. T. Chater to look for the bird. They came next day, and R.H.C. entered the reed-bed to find out whether the bird was a Moustached Warbler or not. D.D.H. stayed on the bank with me and watched. R.H.C. flushed the bird several times, whereupon other watchers and I all saw it, but D.D.H. each time said that he had not seen it. Eventually R.H.C. got near enough to see it properly and called out, 'It's not a Moustached Warbler'. Hitherto D.D.H. had refrained from comment except for claiming, every time the bird was flushed, that he had not seen it; but now he echoed R.H.C., saying, 'It's not a Moustached Warbler'. So I asked R.H.C. what it was, and he replied that he did not know. I then asked the same question of D.D.H., who replied, 'It's not a Moustached and it's not Cetti's; you have a fantastically rare bird here, new to the British list.' But still he could not identify it.

Two days later, on 18th March, D.D.H. came again to Titchfield Haven and now stated that the bird was a Cetti's Warbler, contradicting what he had said on 16th March.

From this account, based on my copious notes made in the field at the time, it will be realised that the letter from R.H.C. and D.D.H. not only contains several inaccuracies, but also omits to mention the greatest cause of doubt in identification—the song. To say that

there was a misidentification is quite wrong. The whole purpose of my asking for help from I.J.F.-L. was to identify the bird. R.H.C. and D.D.H. state that on 16th March D.D.H. was familiar with Cetti's Warbler and was thus able to identify the bird as such, 'as was R.H.C. later when he had been able to consult books'. On the contrary, on 16th March D.D.H., even if he knew Cetti's Warbler then, was unable to identify it, and it was not until he returned on 18th March (presumably after consulting books) that he identified it as a Cetti's Warbler. D.D.H. says of 16th March, 'We informed local observers, a number of whom were present . . . but they were unable to accept our views'. Of the four local observers present (apart from myself), one already thought that the bird was a Cetti's Warbler and the three others had insufficient ornithological knowledge either to dispute or to agree with D.D.H. Moreover, I was present all the time, but never heard D.D.H. make the alleged remarks.

R.H.C. and D.D.H. call the bird a 'perfectly normal individual', whereas to me it appeared decidedly abnormal in that its song was grossly aberrant from *The Handbook*'s description, and I thought that its tail was not the right shape for a Cetti's Warbler.

R.H.C. and D.D.H. say, 'Our very first glimpses showed us that something was wrong since we saw it near a Dunnock *Prunella modularis* . . . and it was quite obvious that the two birds were of approximately the same size!' *The Handbook* gives the length of the Moustached Warbler as about 5 inches, of Cetti's Warbler as about $5\frac{1}{2}$ inches and of the Dunnock as about $5\frac{3}{4}$ inches. How could one judge this when one only had a quick glimpse? And how, particularly, could D.D.H., who claimed each time the bird was flushed that day that he had not seen it?

R.H.C. and D.D.H. maintain that they were 'the first to correct the blunder'. But no blunder had been made. Identification was left to the mist-net.

My statements are based on copious notes which I made in the field at the time. I noticed that D.D.H. did not make any notes while he was present. Is it not conceivable that his memory has tricked him, and that events have been coloured, and dates wrongly stated, giving a false picture of what really happened? C. SUFFERN

Sirs,—How very fortunate are ornithologists in this country to have two such competent, experienced and modest field-ornithologists as R. H. Charlwood and D. D. Harber to correct their mistakes.

B. A. E. MARR

Sirs,—The letter from R. H. Charlwood and D. D. Harber in your June issue made astonishing reading. The worth of such a record bears a strong resemblance to the clock that struck thirteen: not only

was it intrinsically wrong, but it cast serious doubt on all that went before!

But this bizarre episode has wider implications. For years ornithologists have been hot in pursuit of rarities, abetted by *British Birds*. The apotheosis of this cult was the absurd publicity given to the unfrocking of the 'Hastings Rarities'. Such antics might be thought harmless, although members of the cult would surely be better occupied with stamp collecting, were it not for the large number of ornithologists thus seduced from more useful work. It is very hard today to persuade members of local bird organisations to join in even the most simple enquiry, largely because of this cult. It is considered better to view a dubious 'Hoodwink' than accurately to record a mundane Dunnock.

So, in the fear that such mass hallucinations as described by your correspondents may be more widespread, may I suggest that the 'Rarities Committee' leaves such matters to the British Ornithologists' Union and the weight of your journal's influence be lent to proper scientific study. MICHAEL RAYNER

[In printing three out of the many letters received on this subject we feel that some editorial comment is called for. Now that careful sight identifications have in Britain generally replaced specimens as the means of establishing records, constant vigilance is needed to ensure that errors do not easily get by. Unfortunately, partly through weaknesses of human nature and partly owing to the excessive and highly competitive preoccupation with rarities as such, emotions are readily aroused whenever mistaken identification is suggested or proves to have occurred. This correspondence shows once more how highly charged the whole surrounding atmosphere is.

While we regret such pain as our publication of the original letter has caused, and do not identify ourselves with some parts of its contents, we feel reinforced in the view that it was necessary in the broader interest to allow this topic to be ventilated. It took many years before the proposition became accepted that no ornithologist, however eminent, could justifiably claim to have a critical or exceptional occurrence accepted simply on his own word without submitting adequate evidence for scrutiny by others not personally involved. No one any longer seriously disputes the wisdom of this rule; and most know of cases where even normally impeccable authorities have slipped up in the field, at least in their initial tentative diagnosis. While independent checking wherever possible has proved its value, there is a disturbing series of cases where several experienced observers in succession have reached what has eventually proved to be a wrong judgment, and have persuaded one another of the existence of some character which was not there or which was quite different from what they all supposed.

Fortunately, mist-netting, photography and other devices have helped to provide a further check. Most ornithologists well understand the importance of keeping a diagnosis purely tentative, and saying so, until they have conclusive evidence.

In view of the conflicting accounts of early sightings of the Hampshire Cetti's Warbler it seems wrong as well as unkind to attribute to those concerned any blame on that account; their action in inviting expert opinions and the trouble taken in mist-netting the bird for conclusive examination led to the right solution. On the other hand, we must maintain that some candid discussion of the problem was in the best interests of ornithology and that the case of the Hampshire Cetti's Warbler formed a legitimate peg to hang it on. We regret, however, the obvious tendency for the discussion to sink to conflicts of personalities and the bandying of abuse, and we ourselves have tried to handle this correspondence so as to keep the temperature down, and to enable all of us to learn to do better by facing the unpalatable truth that none of us is perfect.—EDS.]

Field-identification of Hippolais warblers

Sirs,—I read D. I. M. Wallace's important paper on 'Field-identification of Hippolais warblers' (*Brit. Birds,* 57: 282-301) with great interest. My experience is limited to Icterine Warblers *Hippolais icterina* and Melodious Warblers *H. polyglotta* (apart from one Olivaceous Warbler *H. pallida* in Spain), but I would endorse all Mr. Wallace's conclusions regarding these species, though I have found head-shape very variable and of little value as a field-character. However, some additional points concerning the behaviour of the two commoner species seem to me to deserve comment. I have consulted the field-descriptions of *Hippolais* warblers seen at Cape Clear Island, Co. Cork, between 1959 and 1964 (26-33 *icterina* and 14 *polyglotta*) and these amply confirm my own observations.

Whilst *polyglotta* feeds 'quietly', flitting about in vegetation, and when disturbed disappears into cover or remains stationary, *icterina* generally appears more 'nervous', feeding conspicuously on the top of cover with more obtrusive movements, and when disturbed is prone to fly long distances rather than skulk. In every case where a *Hippolais* has been 'conspicuous' and has flown 100 yards or more when disturbed, it has proved to be *icterina*. In no fewer than 28 of the 33 sets of field-descriptions of *icterina*, the 'dashing' flight of the species has been specifically commented upon, while in no case has this been noted in the 14 *polyglotta*. In fact, five of the descriptions of *polyglotta* comment on the short, weak, fluttering flight. This apparent behavioural difference might be helpful in conjunction with the more refined and detailed characters so clearly analysed by Mr. Wallace.

In conclusion, I should like to thank all the 69 observers who have

seen and described *Hippolais* warblers at Cape Clear Bird Observatory and whose observations I have drawn upon to confirm my own.

J. T. R. SHARROCK

Sight-identifications of shearwaters

Sirs,—In recent years a considerable amount of skilled observation has resulted in a great increase in the number of records of some sea-birds which were previously almost unrecorded, or at least considered rare, in British and Irish waters. This is especially true for certain shearwaters. While not for a moment wishing to cast doubt on most of these records, we find it difficult to accept all of them as proved. In particular, we should like to emphasise one factor, already pointed out by Dr. M. P. Harris (*Brit. Birds,* 58: 349-350), which seems to us to make it almost impossible to identify the Madeiran Little Shearwater *Procellaria baroli baroli* in the field, although you have recently published an observation by Oscar J. Merne and T. R. E. Devlin of one off Malin Head, Co. Donegal, in October 1964 (*Brit. Birds,* 58: 189-190). This is that the size range of the Manx Shearwater *Procellaria p. puffinus* is vastly greater than suggested by the measurements in *The Handbook.*

In the course of ringing about 9,000 Manx Shearwater fledglings on Skokholm, Pembrokeshire, in the autumn of 1965, we also took wing lengths of some and weights of many. While the majority of these fell within the range of measurements stated in *The Handbook*, a few were very considerably smaller. One such individual was brought back to the observatory on the night of 6th September and examined in detail. It was plump and apparently in good condition and, judging from the small amount of sheath left on the longest flight-feathers, its growth was nearly complete; it was, in fact, on the point of fledging. The measurements of this individual and those of the Manx and Madeiran Little Shearwaters given in *The Handbook* are set out below:

	P. p. puffinus (small individual)	*P. b. baroli* (*Handbook* range)	*P. p. puffinus* (*Handbook* range)
Total length	10 inches	10 inches	14 inches
Wing	202 mm.	170-187 mm.	224-244 mm.
Tarsus	38 mm.	35-40 mm.	42-47 mm.
Bill (from feathers)	28.5 mm.	24-28 mm.	32-39 mm.

As mentioned above, the final wing-length of this individual would have been a little longer. However, in spite of its plumpness, its weight was only 280 grams compared with an average of 466 grams for 81 others that night. Careful examination of this and other small shearwaters handled gave us no reason to believe that they were anything but exceptionally small *P. p. puffinus.* Yet in the field the supposed differences between Manx and Madeiran Little Shearwaters are ones of

size and colour. In autumn, in fact, there is also considerable variation in the colour of Manx Shearwaters, from the dark 'creosote' brown of adults with worn plumage through to the very dark slate, almost black, of recently feathered juveniles. Hence, some Manx are the same colour as Madeiran Little, and different from others of their own species. Incidentally, in spite of the suggestion by Messrs. Merne and Devlin that Manx Shearwater legs are pink, we agree with Dr. Harris that many are not wholly pink, even in the hand; although most have a dirty pink patch on the webs, this is not visible on the folded foot and ones held up in the field at distances of 400-800 yards give the impression of very dark legs even under the best viewing conditions.

We must stress that individuals as small as the one described above are rare, probably rarer than one per 1,000. However, we feel that, had we seen this one (or some of the others we examined) in flight with other Manx Shearwaters, we might have thought that it was of a different species. As a result, we could not be confident of identifying Madeiran Little Sheerwaters in the field because, compared with small Manx, they seem to have no distinguishing feature or combination of features apart from, so we are told, a buoyant, more petrel-like flight; but we do not know whether small Manx have a flight similar to those of normal size and so we cannot comment on this.

C. M. Perrins, A. W. Diamond,
P. J. Straw and C. K. Britten

Great Black-backed Gulls preying on Storm Petrels

Sirs,—In view of the previous communications on this subject (*Brit. Birds,* 58: 219-220 and 444-445), it seems worthwhile summarising the situation on Annet, Isles of Scilly. Great Black-backed Gulls *Larus marinus* were first recorded killing Storm Petrels *Hydrobates pelagicus* on Annet in June 1914, though the numbers taken then were evidently very small, A. Whitaker and T. M. Fowler (*Wildlife,* 8: 269-279) finding only two corpses among the remains of many Puffins *Fratercula arctica* and Manx Shearwaters *Procellaria puffinus* 'which the gulls had devoured'. More recently, in 1952, A. G. Parsons discovered a few gull pellets there containing remains of petrels and mentioned (*Cornwall B.W. & P.S. Ann. Rep.,* 22: 46) that more had been seen in the previous year; and in June 1962 I found a dozen or so such pellets on the island.

Then on two days in June 1963 I found at least 100 castings containing petrels, mostly near Great Black-backed Gull nests around the southern half of the island. This sudden marked increase in the amount of predation on Storm Petrels was clearly correlated with a recent increase in the Great Black-backed Gull population on Annet. Until 1963, the latter nested almost entirely on the northern half of the island and it was not until that year that numbers (about 30 out of the total population of some 150 pairs) began nesting along the edges of

the storm beaches around the southern half where the main petrel colonies are situated. Further increases in the Great Black-backed Gull population took place in 1964 (192 nests on 20th May) and 1965 (over 200 breeding pairs). No intensive searches for pellets were made, but on three days in June 1965 about 50 containing petrel remains were found along the south-western coast. These were again located close to Great Black-backed Gull nests and there was no evidence to suggest that petrels were being preyed upon by Herring Gulls *L. argentatus* or Lesser Black-backed Gulls *L. fuscus*.

Not all the pellets were examined for rings, but four were discovered in 1963 and one in 1965. All five were very worn, their inscriptions being illegible, but the wear was consistent with the birds having carried the rings for at least four years. With the kind permission of the Nature Conservancy, about 2,200 full-grown Storm Petrels have been ringed on Annet since 1957. Subsequent retrapping has shown that ring wear is heavy and many birds must lose their rings after about four years. It is, therefore, all the more curious that the five rings found in gull pellets were all from these older birds; this limited evidence suggests that in early summer older (and presumably experienced) individuals are being preyed upon at least as often as younger ones.

On the basis of counts made since 1961 of singing birds, and other evidence from trapping, the Storm Petrel breeding population on Annet probably numbers at least 1,500 pairs. But neither the total nor the proportion being preyed on by gulls throughout any breeding season is known, and without further much-needed research the effect of the recent apparent increase in predation cannot be assessed.

The possible consequences may be indicated by the past history of the two species on the much smaller island of Rosevear, about five acres in extent and lying two miles south-west of Annet. In the last century this island was regarded as the main breeding station for Storm Petrels in Scilly, and between 1865 and 1880 the species was noted by various authors as a common or abundant breeding bird, though its numbers were 'greatly diminished' by the turn of the century. A very few were still present and presumably breeding in 1962, but in 1965 I could find no trace of them. For much of the second half of the 19th century the Great Black-backed Gull was a rare breeding species in Scilly, though it began to increase throughout the Isles from about 1890 onwards. By 1962 about 120 pairs were nesting on Rosevear and, although their numbers had dropped to 70 pairs the following year (due probably to a shift by part of the population to the neighbouring island of Melledgan), they had increased again in 1965 to 200-250 pairs. Although there is no proof that the dramatic decline to the point of extinction of the Storm Petrel on Rosevear has been due to the Great Black-backed Gull, no other possible explanation comes to mind or fits the facts so well.

J. L. F. PARSLOW

XIV International Ornithological Congress Oxford, 24th to 30th July 1966

The broad details of the XIV International Ornithological Congress were announced earlier this year (*Brit. Birds,* 58: 156-157). Preparations for it and the preceding week's cruise round Scottish bird-islands from 16th to 22nd July are now well advanced. Bookings for the cruise have been very satisfactory, but some places are still available and the organisers can promise unusual opportunities for sea-bird study.

After an official opening of the Congress itself in the Sheldonian Theatre on the evening of Sunday 24th July, there will be five plenary sessions in the mornings of the following week, at which a number of prominent research workers will report on recent advances in the fields of Ecology, Vocal Communication, Orientation, Systematics and Reproductive Physiology. Five afternoons will be devoted to sectional sessions. Various excursions will be organised on Wednesday 27th July. Throughout the Congress, members will be welcome in Rhodes House which will be available as a 'social centre'. The Congress will end with a traditional Garden Party in Trinity College.

The organisers will do their utmost to ensure prompt publication of the *Proceedings.* It is hoped to have the *Volume of Abstracts* available at the opening of the Congress, and to publish the full text of the papers read by invitation at the Plenary Sessions in a volume of *Proceedings,* to appear as soon as possible after the Congress.

To help with the above and because the time is approaching for definite confirmation of provisional bookings with colleges, lecture halls and so on, those who are intending to participate but have not yet registered are requested to write without delay for application forms from **Dr. N. Tinbergen, Secretary-General, International Ornithological Congress, c/o Department of Zoology, Parks Road, Oxford, England.** The completed application forms, together with abstracts of offered papers (if any), should be returned as soon as possible and in any case *not later than 1st March 1966.*

News and comment

Edited by Raymond Cordero

World Wildlife Fund's report.—The World Wildlife Fund has just issued its first report, entitled *The Launching of the New Ark* (published by Collins, and obtainable at 13s. 6d. post free from 2 Caxton Street, London, S.W.1, or any bookseller). Edited by Peter Scott, it covers the first three years of the Fund's activities from 1961 to 1964 (although the financial statements do not go beyond 1963). Amongst the many interesting features are a history of the Fund's foundation, an account of its organisation and methods of working, an impressive list of projects already supported, a longer and challenging list of projects approved for which more money is urgently required, and a schedule of rare mammals and birds, many of which are seriously threatened. In these three years some £675,000 has been channelled into conservation as a result of its existence and initiative—a monument to the hard work

and generosity of many people, though this sum pales beside the annual need for £2 million which has been called for by the Fund's International President, H.R.H. The Prince of the Netherlands. To mention just a single example, the Fund's most important European project, the Coto Doñana reserve in Spain, still requires £100,000 to clear the existing debts, with further sums still if the reserve is to be properly developed and extended. But there are plenty of other equally deserving projects in all parts of the world and, with time everywhere running short, it is to be hoped that this readable and well-illustrated report will encourage many more people to contribute to the activities of the World Wildlife Fund.

Strangford Lough wildlife conservation scheme.—The National Trust is making a special appeal for funds for a conservation scheme for Strangford Lough, the renowned sea lough in Co. Down, which in winter shelters flocks of up to 12,000 Wigeon, 3,000 Brent Geese and 400 Whooper Swans. In recent years traditional wildfowling has been supplemented by indiscriminate shooting which is endangering the lough as a wildfowl refuge. The Trust is proposing to acquire shooting rights over the foreshore and, if possible, also over adjoining land and some freshwater areas near-by. A committee, on which wildfowlers, naturalists, scientists and farmers are represented, has been formed to administer the scheme.

Army aid for the Avocet and other birds.—Although it cannot honestly be said that the Army is usually the friend of the naturalist, Royal Engineers of Eastern Command are at this moment carrying out some very positive conservation work on the Avocet reserve of the Royal Society for the Protection of Birds at Havergate Island, Suffolk. Three bulldozers and two scrapers are being employed in levelling ground so that the centre of the island can be flooded. The solution to the problem of the high salinity in the lagoons on Havergate, which is possibly partly responsible for the Avocets' reduced breeding success in recent years, may lie in draining one area at a time and allowing the rain to wash out the salt. With the Army's help in creating this new part for flooding, it will be possible to drain and rest other sections in rotation.

The Army is also helping the R.S.P.B. on another of their Suffolk reserves at Minsmere, where 40 men of the Royal Engineers are building a new tractor road across the centre of the reed marsh and bridging two of the main dykes. The purpose of this new road is to provide access for the machinery needed in further development at Minsmere, the old road having been swallowed up by the extensions to the area of lagoons and islands. More work still is being done by Royal Engineers on yet another R.S.P.B. reserve at Leighton Moss, Lancashire.

R.S.P.B.'s new magazine.—From 1st January 1966 the Royal Society for the Protection of Birds is changing the title of its magazine *Bird Notes* to *Birds* and adopting a new and larger format as part of a design to bring it more into line with modern publications dealing with conservation. The cover will carry colour photographs and paintings representing the work of the best bird-photographers and artists.

tudy cruise round Scottish bird-islands.—As already announced (*Brit. Birds*, 58: 56), the main excursion arranged for the International Ornithological Congress in ritain next July is a bird-watching cruise in the 12,800-ton British India ship M.S. *evonia* which has been specially chartered by the Scottish Ornithologists' Club. he vessel will leave Greenock on Saturday 16th July 1966 and will cruise right ound the 'top of Britain'—past Muckle Flugga in Shetland, in fact—on her journey the Firth of Forth to dock at Leith on the evening of Friday 22nd July. Landings e planned in the Inner Hebrides, Orkney and Shetland; and inshore cruising will ke passengers close to many remote islands—St. Kilda, the Flannans, North Rona,

Foula, Fair Isle, the Isle of May and the Bass Rock. It will be a wonderful opportunity for seeing some of the spectacular Scottish sea-bird colonies.

Although the cruise is a Congress excursion, it is open to anyone interested in natural history. Many well-known ornithologists from home and abroad have already booked. Indeed, the demand has been so great that all cabin accommodation has now been reserved, but a number of dormitory berths are still available at the low charge of £30 for the 1,200-mile voyage. If you want to avail yourself of this unique opportunity, write at once to the Cruise Secretary, Scottish Ornithologists' Club, 21 Regent Terrace, Edinburgh 7, for a copy of the cruise brochure which gives full particulars.

Royal Air Force Ornithological Society formed.—All three of the Armed Services now have ornithological organisations, following the setting up on 23rd October of the Royal Air Force Ornithological Society. The chairman is Sqdn. Ldr. A. J. J. Hudson and the secretary A. D. MacDonald, 110 Edinburgh Drive, Ickenham, Uxbridge, Middlesex. The founding of this new society owes much to the initiative of Sgt. F. J. Walker (see *Brit. Birds,* 58: 28-29) who is now the assistant secretary.

British photographers' success in photographing Great Bustard at the nest.— M. D. England is not only one of our leading bird-photographers, but in recent years he has carved a special niche for himself by setting out to find and photograph some of Europe's wildest and most spectacular species which have seldom or never been photographed before. Readers of *British Birds* will remember his fine series of plates of Cranes, Ospreys and Black-winged Kites, to name just a few. The Black-winged Kite was a particular triumph as few nests of this species had ever been found in Europe and, when he set out to locate it in 1963, it was not even known whether there were any left. Mr. England surpassed himself this year in Portugal, however, by taking on the seemingly impossible task of photographing the Great Bustard at the nest. This spectacular species, which used to breed in parts of England until about 130 years ago, is one of Europe's largest and heaviest birds, but it is extremely wary and difficult to approach. Previous attempts at photography at the nest have always failed, but he and his companions were successful beyond their expectations. A selection of Mr. England's and Dr. A. N. H. Peach's photographs of the Great Bustard will be published in the January number and, to mark this outstanding achievement, they will include a frontispiece in colour.

Birds of Dorset: an apology.—We regret that in mentioning the Reverend G. W. H. Moule's *A Revised List of the Birds of Dorset, up to 1962* in the October 'News and comment' we appear to have implied that the Dorset Natural History & Archaeological Society were slow in making the reprint available. We understand, however, that the issuing of the reprint closely followed the *Proceedings* in which the list originally appeared and it does, in fact, contain some 1963 and 1964 records.

Farewell.—This is my last 'News and comment'. Pressure of business unfortunately prevents me from devoting the time necessary to cover the ever-widening and diversifying field of ornithological news. I am happy, however, that J. L. F. Parslow has kindly agreed to take over the editing of this feature; any material for possible publication in 'News and comment' should therefore now be sent to him at Winterslow Cottage, Lincombe Lane, Boar's Hill, Oxford.

I should like to thank all those who have supplied me with information and helped in various ways over the past three years. Thanks, too, to the editors of *British Birds* for their guidance and encouragement.

Recent reports

By I. J. Ferguson-Lees

(These are largely unchecked reports, not authenticated records)

This summary is mainly concerned with the two and a half months from the end of August to mid-November and thus follows on after the one published in the September issue (*Brit. Birds,* 58: 390-392). This is perhaps the peak time for unusual vagrants, but, quite apart from these, the period produced several features of major interest. Among them were one of the biggest-ever early September falls of Continental migrants on the east coast, unprecedented movements of **Bearded Tits** *Panurus biarmicus*, and a huge invasion of **Waxwings** *Bombycilla garrulus*.

WAXWINGS

The earliest stages of what is already clearly an exceptionally large irruption of **Waxwings** were referred to in the November issue (58: 478-479) and, apart from repeating the request made then for records to be sent to A. D. TOWNSEND, 11 BASSINGHAM CRESCENT, LINCOLN, I do not propose to dwell much on these birds here. However, it might be added that Fair Isle had as many as 200 Waxwings at the beginning of November and that there were still large flocks, in some cases of hundreds, at various places on the east coast from Shetland down to Kent in mid-month. From the second week onwards they began to appear in inland counties and particularly in west Scotland (200 in Argyll) and north-west England (145 at Leighton Moss in Lancashire), and then in Wales, eastern Ireland and south and south-west England down to Scilly and the Channel Islands. Large flocks have also been seen in south Sweden and Denmark.

BEARDED TITS

Eruptions of **Bearded Tits** from East Anglia have become a regular autumn feature and during each of the six winters from 1959/60 these birds were reported in a number of counties north to Yorkshire and west to Shropshire and Gloucester. Now, however, the movements of this species are on a much larger scale than ever before. Apart from a few in Dorset at the beginning of October, the first reports of wanderers away from south-east England came on 10th October when there were as many as 21 in Huntingdonshire and smaller numbers in Hampshire, Somerset and Lancashire, the last the most north-westerly record during this seven-year series of eruptions. But these were only a curtain raiser for what was to follow. In the five weeks up to mid-November Bearded Tits were seen in some 25 counties as far north as Northumberland, Lancashire (three localities, maximum nine), Flintshire, and Anglesey (several places totalling at least 40); and as far west as Wiltshire, Somerset (three localities, maximum 50), Devon (five localities, maximum 30), Cornwall (two localities, maximum 22), Scilly (two islands, maximum 9), and the Channel Islands.

Nor is the picture as clear as it has seemed in previous winters. When these eruptions began eight years ago, enquiries in the Netherlands suggested that the total population there was too small to be likely to be playing a part. But since then the reclamation of the IJsselmeer has produced a vast increase in reed-bed habitats of many square miles. In one area there this autumn 20,000 Bearded Tits were estimated and 1,500 ringed, and the fascinating sequel was the retrapping of Dutch-ringed Bearded Tits in October and November in Kent (two), Hertfordshire, Cambridgeshire, and Flintshire (two with successive ring numbers). Suffolk-ringed ones have appeared in Hertfordshire and Hampshire, and two caught in Dorset then

moved on to Somerset. Since the numbers dropped in East Anglian reed-beds in September and early October, it seems clear that both the British and Dutch populations are involved. That numbers are moving about on the Continent too is illustrated by many in Belgium and 200 near Gatteville on the Cherbourg peninsula in France. It will be interesting to see how much new colonisation all this produces as the minor eruptions of previous winters have resulted in no more than a small spread in breeding range north and south in south-east England. The eruptions of Bearded Tits in Britain since 1959 are being analysed by H. E. AXELL, MINSMERE BIRD RESERVE, WESTLETON, SAXMUNDHAM, SUFFOLK and we should be grateful if further reports this winter could be sent direct to him.

EARLY SEPTEMBER

Turning back the clock now to early September, the first week of that month produced one of the most spectacular falls of Continental migrants ever recorded on the east coast. Early September arrivals of Scandinavian warblers, flycatchers and chats are not uncommon and large-scale falls occurred in 1956 and 1958 (*Brit. Birds*, 52: 334-377). These, however, all pale into insignificance beside the events of 3rd and 4th September when the combination of fine conditions in Scandinavia, a depression and east to south-east winds in the southern North Sea, and heavy mist and rain over the western North Sea and eastern England provided the conditions for large-scale migration from Scandinavia, off-course drifting and then grounding by bad weather. The main fall took place on the 3rd, but the weather was so bad that day that its extent could not fully be determined until the 4th. The whole of the east coast from Shetland to Suffolk was affected, but the really staggering numbers were confined to Suffolk and, to a lesser extent, Norfolk.

Minsmere (Suffolk) has become the generally quoted example, for there, on a three-quarter mile front of shore and marsh, estimated increases among some 50 species included 750 **Whinchats** *Saxicola rubetra*, 1,500 **Pied Flycatchers** *Muscicapa hypoleuca*, 2,000 **Garden Warblers** *Sylvia borin*, 4,000 **Wheatears** *Oenanthe oenanthe* and no less than 7,000 **Redstarts** *Phoenicurus phoenicurus*. These species were generally the dominant ones and, although nowhere else produced quite such large numbers, the Minsmere proportions show the general pattern, except that **Whinchats** and **Garden Warblers** became more dominant further north (110 **Whinchats** on Fair Isle) where the fall was much less spectacular. Not far from Minsmere, for example, Walberswick had over 1,500 **Redstarts** and smaller numbers of the other species mentioned, as well as over 500 **Tree Pipits** *Anthus trivialis*. At Lowestoft (Suffolk) there were 1,500 **Whinchats,** 2,000 **Wheatears,** 3,000 **Pied Flycatchers** and 5,000 **Redstarts** in an area a quarter of a mile by three-quarters.

In addition to these and other passerines which are summer visitors to Europe generally, the movement included numbers of **Robins** *Erithacus rubecula*; some of the first **Fieldfares** *Turdus pilaris*, **Redwings** *T. iliacus* and **Bramblings** *Fringilla montifringilla*; and, in striking contrast to previous falls of this kind, big increases in northern waders—**Whimbrels** *Numenius phaeopus*, **Ruffs** *Philomachus pugnax*, **Greenshanks** *Tringa nebularia*, **Wood Sandpipers** *T. glareola*, **Curlew Sandpipers** *Calidris testacea*, **Little Stints** *C. minutus* and even a scattering of **Temminck's Stints** *C. temminckii* and **Dotterels** *Charadrius morinellus*—as well as **Black Terns** *Chlidonias niger* in flocks of up to 200. There was also a good scattering of such scarcer passerines as **Siskins** *Carduelis spinus*, **Ortolan Buntings** *Emberiza hortulana* and, especially striking, **Wrynecks** *Jynx torquilla* and **Bluethroats** *Cyanosylvia svecica*. The last two, which are normally seen in ones and twos on these occasions, were reported in tens and twenties in East Anglia. At least 140 Wrynecks were recorded in Norfolk and, citing Minsmere again, there were about 25 of each of these species there. This period is being analysed by PETER DAVIS, BRITISH TRUST FOR ORNITHOLOGY, BEECH GROVE, TRING, HERTFORDSHIRE, who needs all relevant records.

(*To be continued*)

Short index of English names of birds

his simplified index is confined to the numbers of the first pages of papers, notes nd letters on the species concerned, together with significant references in con- ributions of a more general nature. Casual references to other species within the ext are not included, however, nor are birds mentioned in reviews or in the 'Recent eports' and 'News and comment'. Such lists as the 'Report on rare birds in reat Britain in 1964' are completely indexed, but the Ringing Supplement must again be left to the comprehensive index

Notice to Contributors

itish Birds publishes material dealing with original observations on the birds of itain and western Europe or, where appropriate, on birds of this area as observed other parts of their range. Except for records of rarities, papers and notes are rmally accepted only on condition that the material is not being offered to any her journal. Photographs (glossy prints showing good contrast) and sketches are elcomed. Proofs of all contributions are sent to authors before publication.

After publication, 25 separates of papers are sent free to authors (two or more thors of one paper receive 15 copies each); additional copies, for which a charge made, can be provided if ordered when the proofs are returned.

Papers should be typewritten with double spacing, and on one side of the sheet ly. Shorter contributions, if not typed, must be clearly written and well spaced.

Notes should be worded as concisely as possible, and drawn up in the form in hich they will be printed, with signature in block capitals and the writer's address arly written on the same sheet. If more than one note is submitted, each should on a separate sheet, with signature and address repeated.

Certain conventions of style and layout are essential to preserve the uniformity any publication. Authors of papers in particular, especially of those containing stematic lists, reference lists, tables, etc., should consult the ones in this issue as a ide to general presentation. English names of species should have capital tials for each word, except after a hyphen (e.g. Willow Warbler, Black-tailed odwit), but group terms should not (e.g. warblers, godwits). English names are ose used in *The Handbook of British Birds*, with the exception of the changes listed in *tish Birds* in January 1953 (46: 2-3). The scientific name of each species should underlined (but not put in brackets) immediately after the first mention of the glish name. Subspecific names should not be used except where they are evant to the discussion. It is sometimes more convenient to list scientific nes in an appendix. Dates should take the form '1st January 1965' and no er, except in tables where they may be abbreviated to '1st Jan.', 'Jan. 1st', or n 'Jan. 1', whichever most suits the layout of the table concerned. It is particu- y requested that authors should pay attention to reference lists, which otherwise se much unnecessary work. These should take the following form:

CKER, B. W. (1949): 'Species and subspecies: a review for general ornitholo- ists'. *Brit. Birds*, 42: 129-134.

THERBY, H. F. (1894): *Forest Birds: Their Haunts and Habits.* London. p. 34.

ious other conventions concerning references, including their use in the text, uld be noted by consulting examples in this issue.

ables should be numbered with arabic numerals, and the title typed above in style used in this issue. They must either fit into the width of a page, or be gned to fit a whole page lengthways. All tables should be self-explanatory

igures should be numbered with arabic numerals, and the captions typed on a rate sheet. All line-drawings should be in indian ink on good quality drawing er (not of an absorbent nature) or, where necessary, on graph paper, but this t be light blue or very pale grey. It is always most important to consider how . drawing will fit into the page. The neat insertion of lettering, numbers, ws, etc., is perhaps the most difficult part of indian ink drawing and, unless he had considerable experience of this kind of work, an author should seek the of a skilled draughtsman.

British Birds

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British Birds

Vol. 58 1965

Ringing Supplement

Report on bird-ringing for 1964*

By Robert Spencer

Ringing Officer, B.T.O.

From time to time it is suggested that ringers are too interested in numbers, or that their guiding principle should be 'quality, not quantity'. These are mistaken views which spring from a superficial assessment of the situation. The true aim of all ringing is to discover facts about the lives of birds—facts which, for the most part, can be discovered by no other method. Granted that it is carried out safely, the single criterion by which ringing should be judged is the addition it makes to our knowledge of birds. No species is inherently more worth ringing than another: the Starling *Sturnus vulgaris* and the House Sparrow *Passer domesticus* may be thought of as humdrum species and the Kestrel *Falco tinnunculus* and Nightingale *Luscinia megarhynchos* as being 'quality', but who shall say that it is more praiseworthy to learn about one than the other? Of course, when the results are used as a guide to the formulation of conservation policies, 'quality' may assume much greater importance. On the other hand, any programme to control a species which has reached pest status must be based on a long series of recoveries.

As far as the ringers' preoccupation with numbers is concerned, a comparison of columns four and six of table 2 will provide an explanation. To be valid, any analysis must be based on a large sample of recoveries: within reason, the more the better. For some species it is necessary to ring several hundreds before one can be certain of a single recovery, and perhaps tens of thousands before there are sufficient records to permit even a simple analysis. It must be admitted that, for species such as these, ringing is not an economical way of studying movements and life-span, but it is the only known method of obtaining

*This is the twenty-eighth report issued on behalf of the Ringing and Migration Committee (formerly the Bird-Ringing Committee) and is a publication of the British Trust for Ornithology. For the twenty-seventh report, see *Brit. Birds,* 57: 525-596.

the desired information and, as the cost is borne almost entirely by the ringers, the effort is certainly justified. Furthermore, there is, happily, a law of improving returns. As the number of active ringers increases, and as proportionately more of a given species are ringed each year, a stage is reached where ringers start to catch each other's birds. The prime example of this is, of course, the Sand Martin *Riparia riparia*, for which the percentage recovered each year has improved tenfold in the last eight years. Similar trends are beginning to show for other species, notably the *Acrocephalus* warblers, and the technique is obviously capable of extension.

There remains the question of the much-ringed species such as the Starling, of which it is sometimes asked, 'Surely you have enough recoveries now?'. For many of these species, analysis can now move beyond the simple concept of establishing general patterns of movement and mortality. With a greater annual intake of recoveries, it is possible to compare one year with another, thus throwing light on such features as population trends and their relation to mortality in each year, the effect of cold winters, and so on. For examples of these annual fluctuations, the reader is invited to compare the recoveries of Lapwing *Vanellus vanellus* and Song Thrush *Turdus philomelos* in this report with those for the previous year. He will note fewer deaths and more restricted movements in 1964: clear evidence of the beneficial effects of a mild winter. It must be emphasised that before comparisons of this nature may be made, a high annual intake of recoveries is necessary, and this in turn requires a high level of ringing.

Such was, indeed, the situation in 1964. At just short of 450,000, the grand total ringed was almost 3% higher than the figure for 1963. Unfortunately, it included proportionately fewer nestlings than usual, but it is hoped that this was merely a short-term tremor in the general upward trend of nestling ringing. Inevitably there were numerous fluctuations in the individual totals which go to make up the gross figure, by far the largest of these being a fall of 20,000 in the number of Starlings ringed. However, comparison with other years shows that this drop was no more than a return to 'normal' after the exceptionally high catches made during the cold weather in early 1963.

No work has been more influential in British ornithology than *The Handbook of British Birds* (1938-41), but, in the quarter of a century since it appeared, ringers have brought to light numerous inadequacies in the sections on distribution. No better example of these could be found than the promotion of the Melodious Warbler *Hippolais polyglotta* to section 1 of the second table (i.e. over 100 ringed) just one year after the supposedly much commoner Icterine Warbler *H. icterina* made the same move. Trapping for ringing, especially at the west coast observatories, has shown that the Melodious Warbler is quite as regular in its occurrences as its more northern relative.

Finally, before leaving the subject of ringing totals, it may be noted that during the year, two new species were added to the ever-growing table 2. These were Semipalmated Sandpiper *Calidris pusilla* (Skokhold Bird Observatory) and Red-rumped Swallow *Hirundo daurica* (St. Agnes Bird Observatory). This, it is true, is the smallest increase in any recent year, but that is hardly to be wondered at now that the list contains 313 species.

For many years, the term 'Dark Continent', as applied to Africa, has tended to have somewhat bitter overtones in the ringer's ear. Darkness, in the sense of the unknown—a dearth of recoveries—has all too often been the case. Fortunately, 1964 did something to penetrate the gloom, with much the best variety of recoveries ever reported from Africa in a single year. They will be found scattered throughout the pages of the report, starting with a Storm Petrel *Hydrobates pelagicus* near Cape Town and including, for example, a Gannet *Sula bassana* as far south as Portuguese Guinea—where there was also a Common Sandpiper *Tringa hypoleucos*—a Grey Plover *Charadrius squatarola* in Morocco, a Jack Snipe *Lymnocryptes minimus* in Tunisia and a Dunlin *Calidris alpina* in Sénégal. All of these records are the most southerly so far recorded for the species concerned, as were a Turtle Dove *Streptopelia turtur* and a Willow Warbler *Phylloscopus trochilus* in Mali and a Yellow Wagtail *Motacilla flava* in Sénégal. This list is not, of course, comprehensive, but merely singles out some of the more notable African results.

Swans have featured little in the pages of these reports, principally, one may now be sure, because until as recently as 1956 no ring was available for them. Since that year, the Mute Swan *Cygnus olor* has been found to be much less sedentary than was at one time suspected—this report, for example, includes recoveries in the Netherlands and Germany—while the first tentative steps to ring Bewick's Swans *C. bewickii* and Whooper Swans *C. cygnus* have been swiftly rewarded with reports in the U.S.S.R. and Sweden respectively.

The waders mentioned above in the review of African recoveries were in their winter quarters. Equally interesting were some of the recoveries during the summer and autumn months. There were, for example, two Knots *Calidris canutus* in west Greenland, an area from which, amongst the waders, only the Turnstone *Arenaria interpres* has hitherto given recoveries. Characteristically, however, most of our summer recoveries of waders come from the north-east rather than the north-west. In this category there are several important Dunlin records, including a remarkable one from as far east as the longitude of the Ural mountains in the U.S.S.R. Nearer home, a Curlew *Numenius arquata* in the Russian province of Karelia (close to Finland) and a Lapwing in Czechoslovakia were both interesting, if not entirely unanticipated.

In recent years we have come to expect at least one Lesser Whitethroat *Sylvia curruca* recovery in northern Italy each autumn and 1964 did not fail to produce its quota. The Wood Warbler *Phylloscopus sibilatrix*, on the other hand, is seldom recovered and the record from the southern province of Calabria was our first report since 1959. Two more surprising records from Italy were a Blackbird *Turdus merula* and a Pied Flycatcher *Muscicapa hypoleuca*. Since the first, in 1955, there have been many reports of British-ringed Blackbirds in Iberia; one wonders whether we are now at the start of a series from Italy. The flycatcher was of known British stock and was recovered in spring; it thus gives a first indication that some of our breeding population may follow a much more easterly course in spring than in autumn, when the movement is through Iberia.

For a long time now it has been necessary to tabulate the foreign recoveries of Starlings, save for the odd record which calls for fuller treatment. Of several which are included in these pages, perhaps the most noteworthy is that of a summer-ringed juvenile, presumably of British origin, which ended its days on the north coast of Spain. This is, by hundreds of miles, the most southerly recovery of a British-ringed Starling, and a remarkable performance for an individual from a population which is usually regarded as sedentary.

Quite the most encouraging development of recent years has been the advent of the multiple recovery—still a rare phenomenon, alas, but of the utmost value. Naturally such recoveries can only happen when the bird is caught and released again rather than, as is so often the case, killed. Several will be found in this report. There is, for example, the Dunlin originally ringed on the Thames estuary in March 1962, controlled at the Swedish observatory of Ottenby in August 1962, and controlled again on the Thames in October 1962 and November 1964. Even more remarkable, and involving what is certainly the most informative series of recoveries of one bird ever to be reported, is the saga of Blackbird 90060 X. This was originally ringed on Rhum (Inner Hebrides) in November 1961, where it was clearly a winter visitor. In March 1964 it was controlled on the German Island of Sylt. The following winter it was back on Rhum, where it was controlled in December 1964 and again in March 1965, and finally it was found dead in Jutland, presumably its homeland, in April 1965. This fine case history represents ringing at its best, but it must be admitted that the odds against such multiple recoveries are dauntingly high.

It is sad to report that this will be the last special Ringing Supplement to be published. The report will, of course, continue to appear annually in *British Birds*, but as part of a normal number and probably with fewer pages. At a time when more and more recoveries are becoming available for publication, it is ironic and not a little frustrating that economic pressures should have necessitated this change.

COMMITTEE

The members of the Ringing and Migration Committee on 31st December 1964 were Sir Landsborough Thomson (Chairman), R. C. Homes (Vice-Chairman), Miss E. P. Leach, Dr. J. S. Ash, H. J. Boyd, E. J. M. Buxton, Dr. J. C. Coulson, Dr. P. R. Evans, P. A. D. Hollom, Dr. C. D. T. Minton, J. D. Macdonald (representing the Trustees of the British Museum), Dr. C. M. Perrins and R. G. Pettitt; with R. K. Cornwallis, Mrs. S. Cowdy, Stanley Cramp, Peter Davis, J. M. McMeeking and David Wilson (*ex officiis*) and Robert Spencer (Secretary).

FINANCE

The work of the Ringing Scheme is financed primarily by the Nature Conservancy, an annual grant being received to cover the salaries of four out of the five members of the headquarters staff. A grant of £50 from the main funds of the Trust was received towards the cost of special ringing enquiries and the publishers of this report made their annual grant of £25. The Wildfowl Trust obtained their rings at cost price and made a contribution of £75 towards the costs of administration. All other expenses were met from the sales of rings and equipment and from revenue derived from ringing permits. Full accounts for the year 1964 have been published in the Annual Report of the British Trust for Ornithology.

STAFF

Robert Spencer, Robert Hudson, C. J. Mead, Miss U. V. Walker and Miss A. Lawrence.

ACKNOWLEDGEMENTS

The work of the Committee and of the thousand qualified ringers is made possible by the generous grant from the Nature Conservancy, to whom most grateful acknowledgement is made. It is also a pleasure to acknowledge the continued financial support of H. F. & G. Witherby and the Wildfowl Trust. We are indebted to the Trustees of the British Museum for permitting us to use the address of the Museum on our rings and to the telephonists and staff at the Museum for forwarding mail and dealing with enquiries.

In the preparation of this report, the Biological Records Centre of the Nature Conservancy gave valuable help with tables 1 and 2. Peter Davis and Robert Hudson compiled a number of the species summary tables A-J, and C. J. Mead and R. C. Faulkner prepared and drew the maps.

Finally, we should like to thank the thousands of correspondents in many countries who took the trouble to return rings and thus made our work possible.

PUBLICATIONS

The following papers, based wholly or partially on the results of British ringing, have been published:

BOYD, H. (1965): 'Breeding success of White-fronted Geese from the Nenets National Area'. *Wildfowl Trust, 16th Ann. Rep.*: 34-40.

DOBINSON, H. M., and RICHARDS, A. J. (1964): 'The effects of the severe winter of 1962/63 on birds in Britain'. *Brit. Birds*, 57: 373-434.

HARRIS, M. P. (1964): 'Ring loss and wear of rings on marked Manx Shearwaters'. *Bird Study*, 11: 39-46.

——— (1964): 'Recoveries of ringed Herring Gulls'. *Bird Study*, 11: 183-191.

OGILVIE, M. A. (1965): 'Wader ringing by the Wildfowl Trust, 1959-64'. *Wildfowl Trust, 16th Ann. Rep.*: 48-54.

SHARROCK, J. T. R. (1964): 'Grey Wagtail passage in Britain in 1956-60'. *Brit. Birds*, 57: 10-24.

Table 1

NUMBERS OF BIRDS RINGED AND RECOVERED

	Ringed			*Recovered*
	Juv./Adult	*Pullus**	*Total*	*Total*
1964	372,537	76,700	449,237	12,665
1963	355,007	80,918	435,925	14,397
1962	307,924	81,551	389,475	11,689
1961	272,919	77,443	350,362	9,238
1960	219,104	60,085	279,189	7,911
1959	184,837	57,488	242,325	6,949
1958	155,414	45,421	200,835	6,374
1957	137,060	49,286	186,346	5,497
1956	104,665	40,069	144,734	4,808
1955	90,585	35,718	126,303	4,063

Grand total ringed 1909-64	4,156,257
Grand total recovered 1909-64	116,689

*An explanation of the term *pullus* or *pull.* appears on page 543.

Table 2

RINGING AND RECOVERY TOTALS TO 31ST DECEMBER 1964

Section 1—Species of which more than 100 have been ringed

	Ringed				*Recovered*	
	Juv./Adult	*Pullus*	*1964 total*	*Grand total*	*1964*	*Grand total*
le Grebe	8	—	8	243	—	12
ch's Petrel	10	—	10	945	—	7
rm Petrel	1,886	43	1,929	11,338	5	39
nx Shearwater	1,556	6,025	7,581	123,293	221	1,701
nar	201	845	1,046	9,578	14	118
rnet	9	509	518	27,062	55	1,361
morant	3	627	630	7,960	94	1,842
g	119	2,435	2,554	20,585	167	1,637
on	2	115	117	4,834	16	809
lard	4,178	306	4,484	47,853	867	7,920
l	1,708	2	1,710	39,827	397	7,407
ganey	21	4	25	257	3	34
dwall	4	—	4	202	—	43
eon	230	—	230	2,672	28	499
ail	92	—	92	799	16	168
veler	70	3	73	741	15	167
ted Duck	26	—	26	1,208	10	257
nard	19	6	25	288	1	53
er	179	19	198	4,138	89	251
duck	60	124	184	1,830	22	117
y Lag Goose	22	20	42	1,268	52	235
ite-fronted Goose	—	—	—	582	6	168
-footed Goose	—	—	—	11,823	103	2,999
acle Goose	2	10	12	336	37	43
ada Goose	92	75	167	1,685	19	202
e Swan	1,803	326	2,129	12,558	718	2,895
zard	1	39	40	1,139	2	62
rowhawk	15	6	21	1,469	1	212
sh Harrier	—	2	2	125	—	14
l Harrier	—	75	75	752	12	79
tagu's Harrier	—	2	2	263	—	38
grine	—	8	8	195	—	24
lin	6	30	36	829	3	112
rel	25	323	348	3,600	34	450
Grouse	—	—	—	1,538	—	176
ridge	23	—	23	308	7	20
er Rail	67	—	67	815	4	28
crake	3	1	4	749	—	12
rhen	446	20	466	7,607	39	343
	66	16	82	2,477	29	293
ercatcher	1,609	496	2,105	14,434	214	782
ving	153	1,285	1,438	80,217	27	1,801
ed Plover	283	103	386	6,163	9	116
Ringed Plover	27	64	91	580	3	15
Plover	103	—	103	702	3	9
en Plover	38	21	59	829	—	29
stone	148	—	148	1,305	1	18
	614	18	632	8,153	45	453
Snipe	67	—	67	611	4	27
dcock	15	7	22	5,840	6	458
ew	235	156	391	8,169	34	403

	Ringed				Recovered	
	Juv./Adult	*Pullus*	*1964 total*	*Grand total*	*1964*	*Grand total*
Bar-tailed Godwit ..	32	—	32	195	3	9
Green Sandpiper	37	—	37	294	2	10
Wood Sandpiper	13	—	13	158	—	1
Common Sandpiper ..	329	44	373	5,537	7	51
Redshank	587	89	676	9,402	30	356
Greenshank	15	7	22	214	2	9
Knot	430	—	430	4,068	15	41
Purple Sandpiper	9	—	9	193	—	—
Little Stint	41	—	41	392	2	9
Dunlin	6,090	3	6,093	28,892	121	344
Curlew Sandpiper	14	—	14	224	—	—
Sanderling	27	—	27	238	1	6
Ruff	122	—	122	712	4	24
Stone Curlew	—	5	5	379	1	22
Arctic Skua	4	14	18	1,600	4	43
Great Skua	—	577	577	5,651	19	135
Great Black-backed Gull ..	33	627	705	5,532	61	379
Lesser Black-backed Gull	58	4,402	4,460	42,340	205	1,766
Herring Gull	389	4,186	4,575	57,104	267	2,350
Common Gull	122	88	210	5,663	8	235
Black-headed Gull	688	4,340	5,028	75,077	222	3,768
Kittiwake	113	1,627	1,740	21,897	50	497
Common Tern	23	2,172	2,195	40,117	11	762
Arctic Tern	26	2,926	2,952	31,677	23	482
Roseate Tern	4	555	559	8,497	12	95
Little Tern	5	36	41	2,417	—	36
Sandwich Tern	78	3,979	4,057	50,737	74	965
Razorbill	579	453	1,032	13,856	21	406
Guillemot	136	280	416	9,339	21	328
Black Guillemot	15	47	62	839	—	9
Puffin	983	214	1,197	19,394	20	133
Stock Dove	10	50	60	2,299	9	169
Rock Dove	—	—	—	125	—	5
Woodpigeon	295	606	901	10,858	83	917
Turtle Dove	117	86	203	2,399	10	82
Collared Dove	91	9	100	208	3	13
Cuckoo	84	19	103	2,314	5	78
Barn Owl	3	57	60	1,503	13	235
Little Owl	34	39	73	1,970	15	177
Tawny Owl	41	139	180	3,175	12	229
Long-eared Owl	10	22	32	639	1	49
Short-eared Owl	3	7	10	481	1	38
Nightjar	10	5	15	532	—	12
Swift	4,738	159	4,897	35,243	114	744
Kingfisher	97	—	97	1,839	1	62
Green Woodpecker ..	30	—	30	701	1	39
Great Spotted Woodpecker	117	6	123	1,485	14	79
Lesser Spotted Woodpecker	10	—	10	113	—	—
Wryneck	8	—	8	666	—	13
Woodlark	—	—	—	503	—	2
Skylark	421	208	629	14,075	18	12
Swallow	28,241	7,432	35,673	208,299	343	1,57
House Martin	2,704	29	2,733	36,103	31	29
Sand Martin	46,685	58	46,743	181,075	1,376	3,31
Raven	1	130	131	1,260	23	13
Carrion/Hooded Crow ..	32	130	162	4,595	18	31
Rook	109	627	736	12,152	59	83
Jackdaw	169	205	374	11,481	41	69

	Ringed				Recovered	
	Juv./Adult	*Pullus*	*1964 total*	*Grand total*	*1964*	*Grand total*
pie	44	97	141	3,852	24	207
... .	266	35	301	2,960	24	227
gh	4	13	17	337	1	26
: Tit	8,740	3,256	11,996	94,741	167	1,604
Tit	19,025	3,572	22,597	200,758	401	3,791
Tit	807	243	1,050	10,336	20	132
a Tit	702	65	767	4,862	12	47
w Tit	653	15	668	2,141	5	11
-tailed Tit	902	1	903	5,308	9	54
ded Tit	170	—	170	1,304	1	15
atch	161	129	290	3,473	10	92
reeper	520	45	565	2,598	2	11
.. .. ..	1,591	8	1,599	19,870	11	150
er	185	201	386	6,138	2	69
e Thrush	456	124	580	13,697	22	463
are	396	—	396	4,064	18	94
Thrush	7,701	1,729	9,430	164,217	306	4,754
ing	2,090	—	2,090	17,820	27	279
Ouzel	43	50	93	2,169	2	36
bird	32,953	2,761	35,704	318,779	1,246	11,549
tear	858	190	1,048	20,764	13	109
chat	123	81	204	4,032	4	36
chat	399	129	528	8,181	—	32
art	788	677	1,465	18,204	14	102
Redstart	82	—	82	836	2	19
ingale	87	12	99	3,967	3	17
roat	12	—	12	235	—	2
.. .. ..	8,941	551	9,492	112,993	240	2,727
hopper Warbler ..	182	14	196	1,246	2	5
Warbler	3,348	270	3,618	15,404	43	112
Warbler	9	—	9	125	—	—
Warbler	5,542	275	5,817	27,529	23	77
lious Warbler* ..	13	—	13	108	—	—
ae Warbler	10	—	10	124	1	1
cap	3,977	93	4,070	12,454	12	59
l Warbler	13	—	13	263	—	—
n Warbler	1,190	71	1,261	9,128	4	26
throat	5,221	276	5,497	65,988	28	280
Whitethroat ..	1,435	35	1,470	6,142	5	31
rd Warbler	—	—	—	153	—	1
v Warbler	8,712	952	9,664	88,007	26	233
aff	2,874	62	2,936	21,080	11	71
Warbler	14	102	116	2,632	1	12
rest	971	6	977	9,337	3	16
est	22	—	22	320	—	—
d Flycatcher ..	1,271	379	1,650	17,862	14	119
lycatcher	698	499	1,197	19,502	9	85
easted Flycatcher ..	16	—	16	167	—	—
ock	11,467	699	12,166	97,744	153	1,321
w Pipit	2,351	422	2,773	40,669	31	392
ipit	132	76	208	4,783	1	9
Water Pipit	365	32	397	10,031	2	75
hite Wagtail ..	2,827	392	3,219	25,372	59	787
Wagtail	64	62	126	3,618	1	31
Wagtail *ssp.* ..	1,735	95	1,830	17,301	27	148
ng	4	—	4	162	3	9
cked Shrike ..	12	33	45	2,709	—	21

*Newly promoted from Section 2

	Ringed				Recovered	
	Juv./Adult	*Pullus*	*1964 total*	*Grand total*	*1964*	*Grand total*
Starling	32,625	1,471	34,098	420,503	1,266	15,67
Hawfinch	20	2	22	286	1	
Greenfinch	17,487	410	17,897	163,465	528	3,37
Goldfinch	3,648	185	3,833	16,464	53	21
Siskin	115	—	115	909	3	1
Linnet	12,664	1,545	14,209	86,222	160	68
Twite	136	8	144	2,691	1	1
Redpoll	2,331	38	2,369	6,743	38	8
Bullfinch	5,379	226	5,605	24,383	106	51
Crossbill	13	—	13	466	—	
Chaffinch	10,020	313	10,333	121,340	131	1,47
Brambling	752	—	752	8,413	6	6
Yellowhammer	2,596	236	2,832	23,429	18	19
Corn Bunting	113	12	125	1,486	—	2
Cirl Bunting	6	—	6	201	—	
Reed Bunting	5,033	412	5,445	32,712	46	20
Snow Bunting	26	—	26	3,016	—	2
House Sparrow	19,854	705	20,559	179,121	404	2,90
Tree Sparrow	6,051	1,392	7,443	41,829	47	26

Section 2—Species of which fewer than 100 have been ringed

(1964 total, grand total, 1964 recoveries and grand total recoveries are given in that order)

Black-throated Diver	—	3	—	—	Red-legged Partridge	5	92	2	20
Great Northern Diver	—	3	—	—	Quail	4	10	—	—
Red-throated Diver	3	21	—	3	Pheasant	3	67	—	4
Great Crested Grebe	3	50	1	1	Spotted Crake	4	17	—	—
Red-necked Grebe	—	2	—	—	Kentish Plover	—	1	—	—
Slavonian Grebe	—	3	—	—	Dotterel	1	45	—	1
Cory's Shearwater	—	1	—	—	Solitary Sandpiper	—	1	—	—
Wilson's Petrel	—	2	—	—	Whimbrel	2	77	—	2
Little Bittern	3	4	—	—	Black-tailed Godwit	8	19	—	—
Bittern	1	49	—	8	Spotted Redshank	15	69	—	2
Red-crested Pochard	—	16	—	4	Temminck's Stint	—	4	—	—
Scaup	2	55	3	14	Semipalmated Sandpiper*	1	1	—	—
Mandarin Duck	—	5	—	—	White-rumped Sandpiper	1	4	—	—
Goldeneye	8	31	3	4	Pectoral Sandpiper	—	17	—	—
Long-tailed Duck	—	5	—	1	Stilt Sandpiper	—	1	—	—
Velvet Scoter	—	3	—	1	Western Sandpiper	—	1	—	—
Common Scoter	1	15	—	3	Buff-breasted Sandpiper	—	2	—	
Red-breasted Merganser	2	22	—	1	Avocet	—	1	—	—
Goosander	2	71	—	10	Grey Phalarope	2	45	—	—
Smew	—	2	—	—	Red-necked Phalarope	—	24	—	—
Bean Goose	1	1	—	—	Pomarine Skua	—	2	—	—
Brent Goose	1	8	—	1	Glaucous Gull	—	5	—	—
Whooper Swan	5	23	2	2	Little Gull	1	2	—	—
Bewick's Swan	1	12	2	2	Sabine's Gull	—	1	—	—
Kite	—	1	—	—	Black Tern	1	4	—	—
Rough-legged Buzzard	—	1	—	—	Gull-billed Tern	—	1	—	—
Golden Eagle	6	62	—	4	Little Auk	—	22	—	—
Hobby	—	63	—	5	Scops Owl	—	1	—	—
Red-footed Falcon	—	1	—	—	Snowy Owl	—	1	—	—
Black Grouse	32	47	—	1	Hoopoe	2	13	—	—
Ptarmigan	—	3	—	—	Short-toed Lark	1	4	—	—
Capercaillie	—	3	—	—	Shore Lark	1	22	—	—

*Added to the list in 1964

..umped Swallow* ..	1	1	—	—	Dusky Warbler	1	2	—	—
..n Oriole	—	4	—	—	Radde's Warbler	1	3	—	—
..acker	—	1	—	—	Richard's Pipit	1	5	—	—
..d Tit	1	66	—	—	Tawny Pipit	1	4	—	—
..throated Thrush ..	—	1	—	—	Pechora Pipit	—	1	—	—
.. Thrush	—	2	—	—	Red-throated Pipit	—	4	—	—
..can Robin	—	2	—	—	Yellow-headed Wagtail ..	1	4	—	—
..n Thrush	—	1	—	—	Great Grey Shrike	7	71	1	2
..heeked Thrush ..	—	3	—	1	Lesser Grey Shrike ..	—	5	—	2
.. Wheatear	—	2	—	—	Woodchat Shrike	1	38	—	—
..eared Wheatear ..	2	3	—	—	Myrtle Warbler	—	1	—	—
..Vheatear	—	1	—	—	Northern Water Thrush ..	—	1	—	—
..n Nightingale ..	—	2	—	—	Yellowthroat	—	1	—	—
..s Warbler	—	1	—	—	Bobolink	—	1	—	—
.. Warbler	—	2	—	—	Slate-coloured Junco ..	—	1	—	—
..Warbler	—	1	—	—	Rose-coloured Starling ..	—	2	—	—
..lated Warbler ..	—	1	—	—	Baltimore Oriole	—	2	—	—
..s Grasshopper					Summer Tanager	—	1	—	—
..bler	—	1	—	—	Scarlet Tanager	—	1	—	—
..Reed Warbler ..	3	9	—	—	Arctic Redpoll	—	3	—	—
..ield Warbler ..	—	1	—	—	Serin	1	2	—	—
..e Warbler	5	35	—	—	Scarlet Grosbeak	2	31	—	—
..billed Warbler ..	—	1	—	—	Pine Grosbeak	—	1	—	—
..ous Warbler ..	—	3	—	—	Parrot Crossbill	—	42	—	—
.. Warbler	—	1	—	—	Black-headed Bunting ..	—	2	—	—
..n Warbler	—	1	—	—	Red-headed Bunting ..	1	16	—	1
..an Warbler	—	1	—	—	Yellow-breasted Bunting ..	—	4	—	—
..rne Warbler	2	12	—	—	Ortolan Bunting	2	33	—	—
..sh Warbler	1	20	—	—	Rustic Bunting	1	11	—	1
..'s Warbler	—	10	—	—	Little Bunting	1	16	—	—
..Warbler	5	14	—	—	Fox Sparrow	—	1	—	—
..browed Warbler ..	5	64	—	1	Song Sparrow	1	2	—	—
..Warbler	—	5	—	—	Lapland Bunting	—	76	—	—

*Added to the list in 1964

Selected list of recoveries reported during 1964

..llowing list is highly selective. To indicate the quantity and nature of the ..al omitted, the total number of recoveries is stated in brackets after the ..ic name of each species, followed by the minimum movement to qualify for ..on and the longest time lapsed between ringing and recovery. All foreign ..ries are either given in full or mentioned in the summaries. Species which ..ed only local movements—generally less than ten miles—are left out, but ..ividual totals thus omitted are listed in table 2.

..ymbols and terms

Ring number: Where this is in italics the ring has been returned.

Age: pull. (pullus)—nestling or chick, *not yet flying*;
juv.—young, *able to fly freely*;
1stW.—first winter;
1stS.—first summer (one year old);
f.g.—full-grown, age uncertain;
ad.—adult; at least one year old.

Sex: ♂—male;
♀—female.

Manner of recovery:	v—caught or trapped, and released with ring; +shot or killed by man; ×—found dead or dying; ×A—found long dead; ()—caught or trapped alive and not released, or released but wi ring removed; /?/—manner of recovery unknown.
Date of recovery:	Where this is unknown the date of the reporting letter is given brackets.
Distance:	The distance, given in miles, and the directions are approximat
Arrangement of entry:	Recoveries are arranged by species, and within species usually l ringing locality from north to south. Ringing details are giv on the first line and recovery data on the second.

Storm Petrel (*Hydrobates pelagicus*) (5; 5 miles; $1\frac{10}{12}$ years)

649107	ad.	18.8.62	Foula: 60°08′N. 2°05′W. (Shetland) BEG
	v	22.6.64	Fair Isle, 45m. S.
649590	ad.	15.8.63	Foula BEG
	v	5.8.64	Fair Isle, 45m. S.
649681	ad.	28.8.63	Foula BEG
	×	2.2.64	Fish Hoek: 34°08′S. 18°25′E. False Bay, **South Africa**
92978	f.g.	30.5.63	Skokholm
	×	24.10.64	*near* Douarnenez: 48°06′N. 4°22′W. (Finistère) **France**

False Bay, the recovery locality of 649681, lies immediately south of Cape Town a the southern limit of the Storm Petrel's winter range. This is the first trans equatorial recovery of a British-ringed Storm Petrel and only the second in Africa waters.

Manx Shearwater (*Procellaria puffinus*) (221; 1,000 miles; $10\frac{9}{12}$ years)

AT93067	f.g.	6.8.62	Hallival: 56°59′N. 6°16′W. Rhum (Inverness) PW
	×	(29.4.64)	North Tolsta, Lewis (Ross) 95m. N.
SS04518	f.g.	10.4.64	Bardsey
	×	2.11.64	Santos: 23°56′S. 46°22′W. (São Paulo) **Brazil**
EC52449	pull.	27.8.64	Skokholm
	×	24.10.64	Piratininga: 22°57′S. 43°05′W. (Rio de Janeiro) **Brazil**
EC56797	pull.	7.9.64	Skokholm
	×	25.10.64	Camboriú: 27°01′S. 48°38′W. (Santa Catarina) **Brazil**
EC56899	pull.	7.9.64	Skokholm
	×	24.10.64	*near* Itajai: 26°50′S. 48°39′W. (Santa Catarina) **Brazil**
EC56748	pull.	9.9.64	Skokholm
	×	2.11.64	Imbituba: 28°15′S. 48°40′W. (Santa Catarina) **Brazil**

Six recoveries in the Bay of Biscay in spring and early summer (France fiv Spain one) conform to the normal pattern.

Fulmar (*Fulmarus glacialis*) (14; 400 miles; $6\frac{7}{12}$ years)

AT90848	pull.	9.8.62	Fair Isle
	×	30.3.64	Winterton-on-Sea (Norfolk) 480m. SSE.
AT45358	pull.	15.8.57	Eynhallow: 59°08′N. 3°08′W. (Orkney) AU
	()	1.4.64	Porkerisnes: 61°29′N. 6°41′W. Suduroy, **Faeroes**

·8243	pull.	5.8.61	Rockfield: 57°49'N. 3°48'W. (Ross) AJW
	/?/	1.8.64	*off* Bell Island: *c.* 50°45'N. 55°30'W. **Newfoundland**
·5190	pull.	10.7.56	Hirta: 57°49'N. 8°34'W. St. Kilda (Inverness) RWJS
	()	18.6.60	*at sea:* 52°16'N. 54°30'W. *off* **Newfoundland**

Gannet (*Sula bassana*) (55; $9\frac{5}{12}$ years)

·512	pull.	15.7.61	Bass Rock: 56°04'N. 2°38'W. (East Lothian) IVBP
	()	19.2.64	*off* Mondello: 38°13'N. 13°20'E. (Palermo) **Sicily**
·349	pull.	7.7.62	Bass Rock JBN
	×	19.1.64	Dakar: 14°38'N. 17°27'W. **Sénégal**
·69	pull.	7.7.63	Bass Rock JBN
	()	4.3.64	*at sea:* 42°40'N. 21°30'W. **North Atlantic**
·34	pull.	14.7.63	Bass Rock PY
	/?/	(6.5.64)	Bissau: 11°52'N. 15°39'W. **Portuguese Guinea**
·89	pull.	4.7.64	Bass Rock PY
	+	14.11.64	Porto Empedocle: 37°18'N. 13°32'E. (Agrigento) **Sicily**
·338	pull.	4.7.64	Bass Rock PY
	()	(12.11.64)	*off* Algiers: 36°50'N. 3°00'E. **Algeria**

·above recoveries, especially that from Portuguese Guinea, are from areas ·heral to the main winter range of the species. Thirty other overseas records · much-frequented localities will be tabulated in a future report.

Cormorant (*Phalacrocorax carbo*) (94; $9\frac{5}{12}$ years)

·55	pull.	5.7.61	Taing Skerry: 59°05'N. 2°58'W. Gairsay (Orkney) AU
	×	0.2.64	Kristiansund: 63°06'N. 7°58'E. (More og Romsdal) **Norway**

· is the first recovery in Norway of a British-ringed Cormorant. Three ·veries in northern Spain and ten in France will be tabulated in a future report. ·veries in British waters, showing movements up to 360 miles, conform closely ·e established pattern.

Shag (*Phalacrocorax aristotelis*) (187; $8\frac{7}{12}$ years)

·ringed in the Isles of Scilly were recovered in French waters during Septem- ·November; one from Fair Isle was found in Norway in January; and one from ·arne Islands was reported off the Dutch coast in April. In home waters, only ·een recoveries showed movements of more than 100 miles.

Heron (*Ardea cinerea*) (16; 100 miles; $8\frac{9}{12}$ years)

· 0	pull.	3.5.59	*near* King's Lynn: 52°44'N. 0°23'E. (Norfolk) CBC
	+	(8.12.64)	Chirk, Wrexham (Denbigh) 140m. W.

Mallard (*Anas platyrhynchos*) (867; $11\frac{1}{12}$ years)

·12	juv. ♂	15.9.62	Peakirk: 52°38'N. 0°17'W. (Northampton)
	+	18.1.64	Sivrihisar: 39°27'N. 31°34'E. (Eskisehir) **Turkey**
·58	f.g. ♀	14.1.60	Slimbridge: 51°44'N. 2°25'W. (Gloucester)
	+	*c.* 1.11.64	Coto Doñana: 37°02'N. 6°27'W. (Huelva) **Spain**

·312 is the first British-ringed Mallard to be reported in Turkey and recoveries ·ain are exceptional. 153 recoveries in more customary foreign localities ·been held over and will be tabulated in a future report.

Teal (*Anas crecca*) (397; $9\frac{3}{12}$ years)

Table A—Countries and months of recoveries of Teal

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	De
Italy (2)	–	–	–	–	–	–	1	–	1	–	–	–
Spain (4)	–	–	2	–	–	–	–	–	–	–	1	1
Portugal (2)	–	–	–	–	–	–	–	–	–	2	–	–
France (41)	10	2	13	–	–	–	–	2	1	3	2	8
Ireland (28*)	9	–	1	–	–	–	–	–	3	–	5	4
Netherlands (9*)	3	–	–	–	–	–	–	–	4	1	–	–
Denmark (28)	–	–	–	–	–	–	–	5	18	3	2	–
Germany (10*)	1	–	–	–	–	–	–	3	3	2	–	–
Poland (1)	–	–	–	–	–	–	–	–	1	–	–	–
Norway (2*)	–	–	–	–	–	–	1	–	–	–	–	–
Sweden (10*)	–	–	–	–	–	2	1	3	2	–	1	–
Finland (13*)	–	–	–	–	2	–	–	7	1	2	–	–
Baltic States(3)	–	–	–	–	–	–	–	2	1	–	–	–
U.S.S.R. (26)	–	–	–	5	12	–	–	5	4	–	–	–

*Total includes undated recoveries

NOTE. The tables are subject to error in cases where it has been necessary to assume that the date of recovery was approximately that of the letter reporting it, whereas the bird may have been dead for some time before being found or reported

EC30537	ad. ♂	16.11.62	Abberton
	+	*autumn* 1963	Hortobágy: 47°37′N. 21°06′E. (Hajdu-Bihar) **Hungary**

Garganey (*Anas querquedula*) (3; $3\frac{1}{12}$ years)

2060404	pull. ♂	15.6.61	Abberton
	+	7.3.64	Cascina Cardinale: 45°16′N. 8°48′E. (Pavia) **Italy**
2060410	juv. ♀	28.7.61	Abberton
	+	17.9.64	Cérvia: 44°16′N. 12°22′E. (Ravenna) **Italy**
EC34055	ad. ♂	16.8.63	Abberton
	+	26.3.64	Treviglio: 45°32′N. 9°36′E. (Bergamo) **Italy**

Wigeon (*Anas penelope*) (28; $10\frac{9}{12}$ years)

3095842	f.g. ♂	28.12.63	Mahee Island: 54°30′N. 5°39′W. (Down) PPM
	+	25.10.64	Porto Garibaldi: 44°40′N. 12°14′E. (Ferrara) **Italy**
AT83736	juv. ♂	17.1.64	Abberton
	+	22.12.64	*near* Villanueva de la Serena: 38°58′N. 5°48′W. (Badajóz) **Spain**

In addition to the above, 21 Wigeon were reported abroad, from localities which do not call for comment; these will be tabulated in a future report.

Pintail (*Anas acuta*) (16; 10 miles; $4\frac{6}{12}$ years)

AJ92852	f.g. ♀	24.1.64	Mahee Island: 54°30′N. 5°39′W. (Down) PPM
	+	1.9.64	Roskilde: 55°40′N. 12°05′E. (Sjaelland) **Denmark**
3007272	juv. ♂	18.11.58	Slimbridge
	+	5.6.63	Nenetsk National Okrug: *c.* 68°00′N. 55°00′E. (Arkhangel) **U.S.S.R.**
AT94553	juv. ♀	29.10.62	Slimbridge
	+	12.5.64	*near* Ust'-Tsilma: 65°26′N. 52°11′E. (Komi) **U.S.S.R.**
AT95990	f.g. ♂	21.3.64	Slimbridge
	+	12.10.64	Veluwemeer: 52°31′N. 5°51′E. (Oost-Flevoland) **Netherlands**

ails ringed as full-grown at Abbotsbury, 50°40'N. 2°36'W. (Dorset), were
vered as follows:

—Ringed—		—Recovered—	
770	30.12.61	10.5.64	*near* Lopydino: 61°10'N. 52°10'E. (Komi) **U.S.S.R.**
10	3.1.62	20.9.64	Vest Stadil Fjord: *c.* 56°10'N. 8°07'E. (Jylland) **Denmark**
93	28.12.62	2.6.64	Zapolyarnyy: 67°29'N. 63°45'E. (Komi) **U.S.S.R.**
993	0.12.63	14.11.64	Ho Bugt: 55°33'N. 8°17'E. (Jylland) **Denmark**
603	16.1.64	26.4.64	Orenburg Oblast, **U.S.S.R.**

Shoveler (*Spatula clypeata*) (15; 15 miles; $2\frac{2}{12}$ years)

326	f.g. ♂	2.3.62	Slimbridge
	+	22.4.64	*near* Shchelkovo: 55°55'N. 38°00'E. (Moscow) **U.S.S.R.**

elers ringed at Peakirk, 52°38'N. 0°17'W. (Northampton), were recovered as
ws:

—Ringed—		—Recovered—	
94*	24.9.62	21.8.64	*near* Krasnoborsk: 61°34'N. 45°59'E. (Arkhangel) **U.S.S.R.**
99	29.9.62	6.1.64	Lago di Lesina: *c.* 41°53'N. 15°25'E. (Foggia) **Italy**
90*	3.10.62	22.3.64	Iciar: 43°16'N. 2°19'W. (Guipúzcoa) **Spain**
362	21.8.63	26.3.64	Gonfreville: 49°30'N. 0°08'E. (Seine-Maritime) **France**
370	7.7.64	21.8.64	Noordwijk-Binnen: 52°13'N. 4°28'E. (Zuid-Holland) **Netherlands**
373	9.7.64	20.12.64	Les Stes Maries de la Mer: 43°27'N. 4°25'E. (Bouches-du-Rhône) **France**
378	4.8.64	26.12.64	Bourcefranc: 45°50'N. 1°08'W. (Charente-Maritime) **France**
92	22.8.64	21.12.64	Le Crotoy: 50°13'N. 1°38'E. (Somme) **France**

*Ringed as full-grown; the remainder were ringed as juveniles

elers ringed at Abberton were recovered as follows:

—Ringed—		—Recovered—	
73	31.7.63	(30.3.64)	Tronzano: 45°20'N. 8°11'E. (Vercelli) **Italy**
62	23.7.64	25.10.64	*near* Torfou: 47°03'N. 1°07'W. (Maine-et-Loire) **France**
65	6.8.64	20.12.64	Sueca: 39°13'N. 0°19'W. (Valencia) **Spain**
67*	14.8.64	24.10.64	Bourg-Madame: 42°26'N. 1°55'E. (Pyrénées-Orientales) **France**

*Ringed as adult female; the remainder were ringed as juvenile males

Scaup (*Aythya marila*) (3; 5 miles; $3\frac{2}{12}$ years)

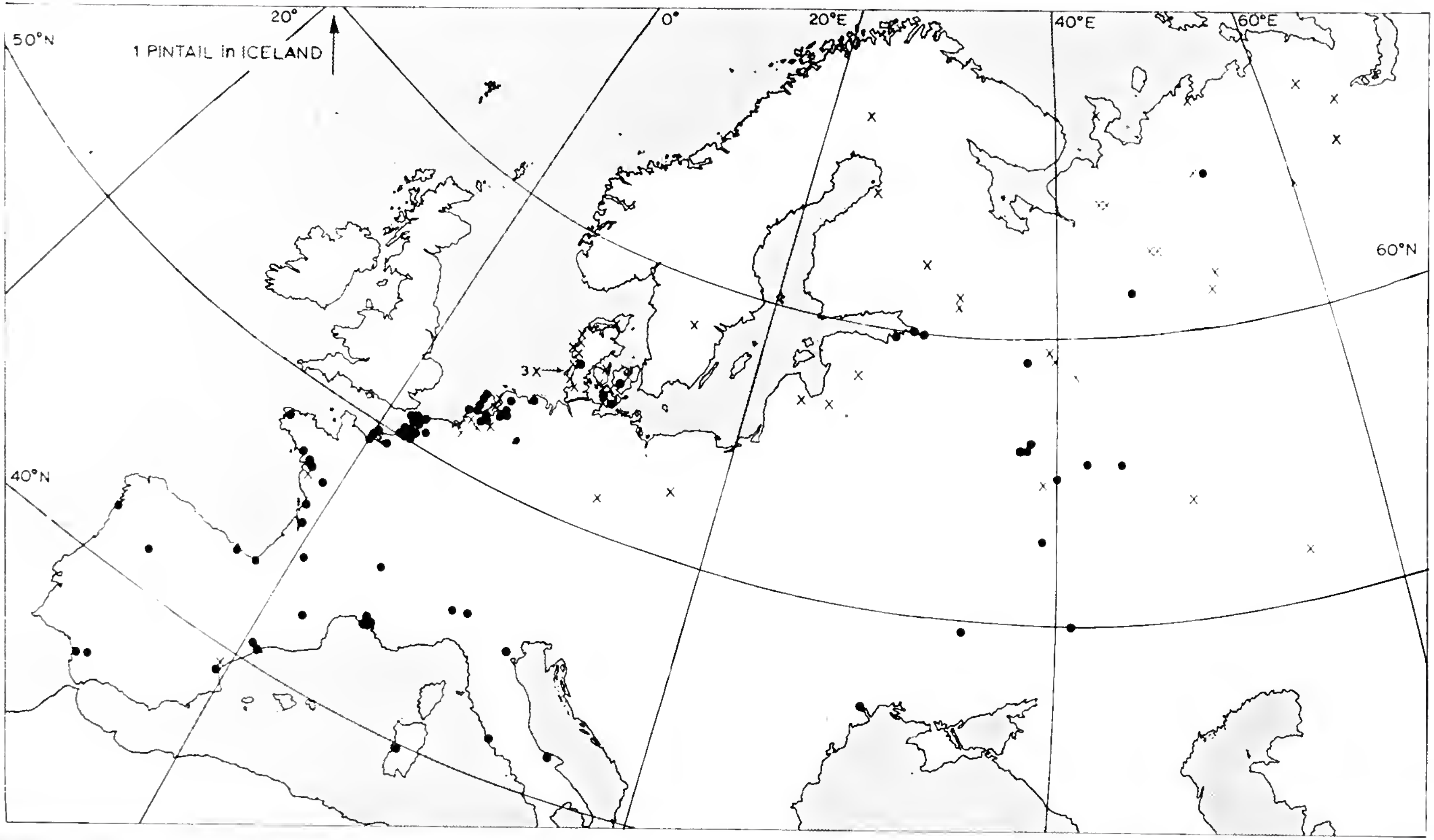
11	ad. ♂	25.2.62	Newburgh: 57°19'N. 2°01'W. (Aberdeen) EAG
	×	10.5.64	Rönnskär: 63°04'N. 20°51'E. (Vaasa) **Finland**
	f.g. ♂	27.10.60	Deeping St. James: 52°40'N. 0°17'W. (Lincoln)
	×	3.1.64	Fynshav: 54°59'N. 9°59'E. Als (Jylland) **Denmark**

are the first recoveries of British-ringed Scaup in Finland and Denmark.

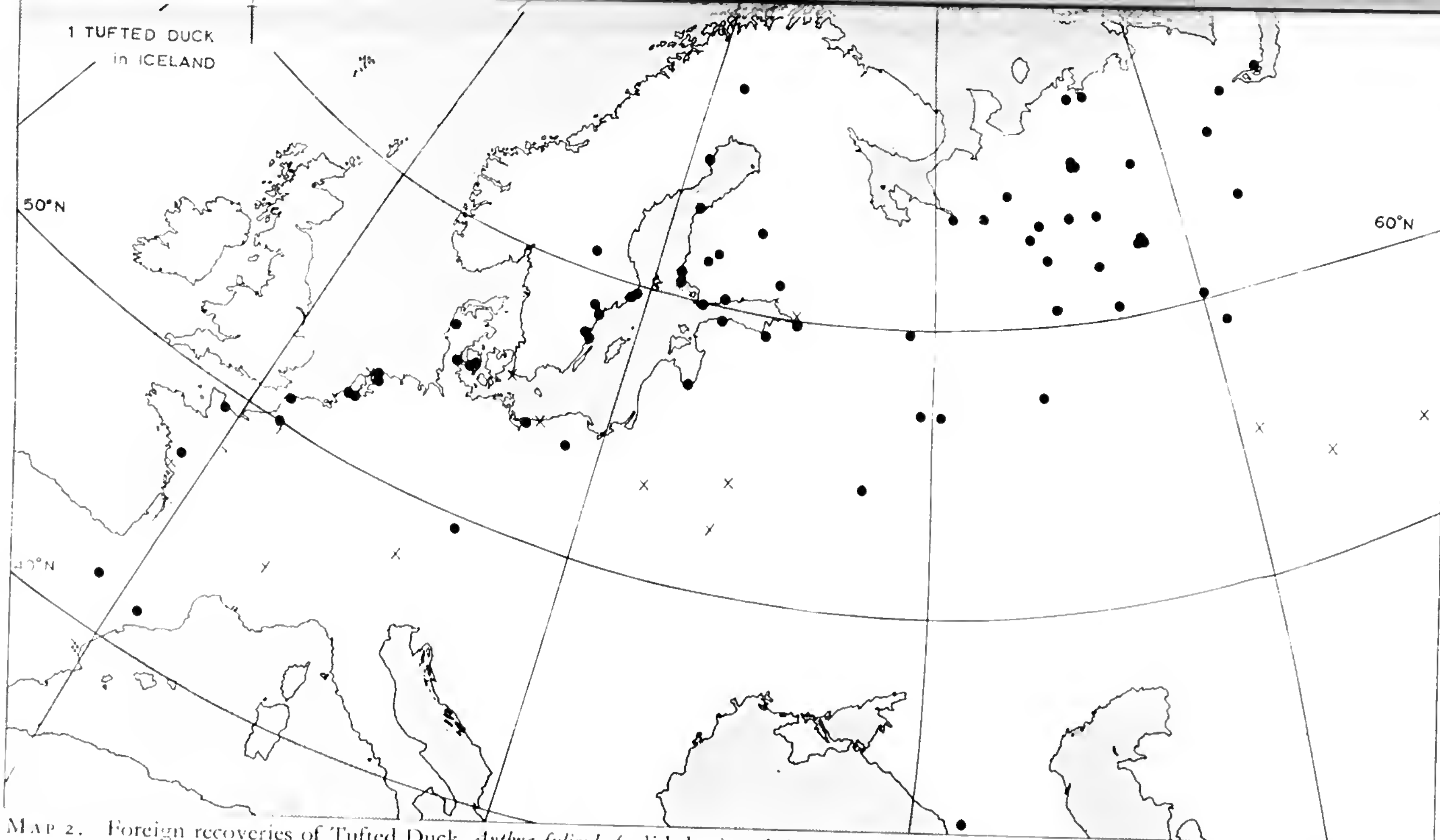
Tufted Duck (*Aythya fuligula*) (10; 75 miles; 2 years)

Ducks ringed as adults at Newburgh, 57°19'N. 2°01'W. (Aberdeenshire),
ecovered as follows:

—Ringed—		—Recovered—	
8	18.12.62	28.6.64	Kolho: 62°07'N. 24°29'E. (Häme) **Finland**
r	7.1.63	17.5.64	*near* Kondinskoye: 62°30'N. 66°01'E. (Tumen) **U.S.S.R.**
5	12.1.63	8.1.64	Iholmen: 55°02'N. 10°31'E. (Fyn) **Denmark**
5	26.1.63	20.8.64	Airaksela: 62°45'N. 27°24'E. (Kuopio) **Finland**



Map 1. Foreign recoveries of Shoveler *Spatula clypeata* (solid dots) and Pintail *Anas acuta* (crosses) reported between 1st January 1955 and 31st December 1964 (*drawn by C. J. Mead*)



MAP 2. Foreign recoveries of Tufted Duck *Aythya fuligula* (solid dots) and Pochard *Aythya ferina* (crosses) reported between 1st January 1955 and 31st December 1964. Comparison should be made between this map of two diving ducks and map 1 of two surface-feeding ducks (*drawn by R. C. Faulkner*)

AT83357	f.g. ♂	2.4.63	Lolham: 52°39′N. 0°20′W. (Northampton)
	+	15.5.64	*near* Gari: 59°24′N. 62°19′E. (Sverdlovsk) **U.S.S.R.**
AT71306	1stS. ♂	6.5.61	Abberton
	+	0.5.63	*near* Leshukonskoye: 64°54′N. 45°42′E. (Arkhangel) **U.S.S.R.**
AT83548	ad. ♂	20.5.63	Abberton
	+	5.6.64	Yar-Sale: 66°52′N. 70°52′E. (Tumen) **U.S.S.R.**
AT83663	f.g. ♀	23.12.63	Abberton
	×	2.5.64	Rönnskär: 63°04′N. 20°51′E. (Vaasa) **Finland**

Pochard (*Aythya ferina*) (1; $3\frac{5}{12}$ years)

948581	f.g. ♂	30.11.60	Deeping St. James: 52°40′N. 0°17′W. (Lincoln)
	+	2.5.64	*near* Uritskoye: 53°20′N. 65°37′E. (Kazakhstan) **U.S.S.R.**

There is only one more easterly recovery of a British-ringed Pochard.

Goldeneye (*Bucephala clangula*) (3; 20 miles; $1\frac{4}{12}$ years)

AJ26462	1stW. ♀	8.1.63	Newburgh: 57°19′N. 2°01′W. (Aberdeen) EAG
	/?/	*mid* 5.64	*near* Luleå: *c.* 65°45′N. 23°00′E. (Norrbotten) **Sweden**

This is only the second foreign recovery of a British-ringed Goldeneye.

Eider (*Somateria mollissima*) (89; $8\frac{10}{12}$ years)

Seven Eiders from Newburgh, Aberdeenshire, were recovered on the coasts of Angus and Fife, some seventy miles to the south (five between January and March and one each in July and August). Two from the Farne Islands in Northumberland were reported from Fife (March) and East Lothian (October). Only three of the birds involved in these movements were more than fourteen months old at the time of recovery.

Shelduck (*Tadorna tadorna*) (22; 100 miles; $2\frac{5}{12}$ years)

AJ51611	pull.	23.7.63	Inverness: 57°27′N. 4°15′W. WT
	+	28.11.64	Puiseaux: 48°12′N. 2°28′E. (Loiret) **France**
418974	ad. ♂	23.3.62	Newburgh: 57°19′N. 2°01′W. (Aberdeen) AU
	v	28.8.64	Grossen Knechtsand: 53°50′N. 8°22′E. **Germany**
AJ86832	pull. ♂	28.7.63	Newburgh AU
	× *ring only*	26.8.64	Skallingen: 55°30′N. 9°10′E. (Jylland) **Denmark**
AJ86855	ad. ♂	5.1.64	Newburgh AU
	×	22.11.64	Carolinensiel: 53°42′N. 7°48′E. (Niedersachsen) **Germany**
AJ33052	pull.	20.7.63	Horsey Island: 51°53′N. 1°15′E. (Essex) JKW
	+	18.1.64	*near* Dundalk (Louth) 350m. WNW.

Grey Lag Goose (*Anser anser*) (52; $4\frac{6}{12}$ years)

There were twelve recoveries in Iceland between April and October. The remaining reports were from Scottish localities.

White-fronted Goose (*Anser albifrons*) (6; $6\frac{2}{12}$ years)

[W]hite-fronted Geese ringed at Slimbridge were recovered as follows:

—Ringed—		—Recovered—	
WT61*	21.2.58	25.4.64	Shishkovo: 57°47′N. 36°28′E. (Kalinin) **U.S.S.R.**
WT362	9.3.59	21.4.64	*near* Novyye Petushki: 55°57′N. 39°28′E. (Vladimir) **U.S.S.R.**
WT369	9.3.59	24.1.64	Lage Zwaluwe: 51°42′N. 4°41′E. (Noord-Brabant) **Netherlands**
WT383	9.3.59	1.1.64	St. Yzans: 45°19′N. 0°50′W. (Gironde) **France**
07393	9.3.59	29.12.64	Langeweg: 51°39′N. 4°40′E. (Noord-Brabant) **Netherlands**
WT575	6.3.62	24.12.64	St. Mary's, Scilly (Cornwall) 210m. SW.

*Ringed as first-winter; the remainder were ringed as adults

[T]he recovery in Gironde is exceptional.

Pink-footed Goose (*Anser brachyrhynchus*) (103; 14 years)

[T]here were three recoveries in Iceland and one at Scoresby Sound, east Greenland. [T]he remainder were from customary localities in Great Britain.

Barnacle Goose (*Branta leucopsis*) (37; 150 miles; $1\frac{5}{12}$ years)

111351	f.g. ♂	2.2.63	Caerlaverock: 54°58′N. 3°26′W. (Dumfries)
	+	8.10.64	Florö: 61°36′N. 5°04′E. (Sogn-og-Fjordane) **Norway**

[In] addition to the above, thirty-two Barnacle Geese ringed at Caerlaverock on [2n]d February 1963 were recovered in Spitsbergen during the breeding season.

Canada Goose (*Branta canadensis*) (19; $11\frac{2}{12}$ years)

[Th]e five recoveries showing movement of more than 100 miles are all consistent [w]ith a moult migration between Yorkshire and the Beauly Firth, Inverness.

Mute Swan (*Cygnus olor*) (718; 100 miles; $8\frac{7}{12}$ years)

32507	ad. ♂	24.8.59	Mistley: 51°57′N. 1°05′E. (Essex) CBW
	v	*summer* 1964	Dirkshorn: 52°45′N. 4°46′E. (Noord-Holland) **Netherlands**
11021	*immature*	3.1.63	Oxford: 51°45′N. 1°16′W. CMR
	v	2.2.64	Lancaster 170m. NNW.
11178	f.g.	15.8.63	Emsworth: 50°51′N. 0°56′W. (Hampshire) DAS
	v	27.10.63	Emsworth
	×	15.5.64	Hattstedt: 54°33′N. 9°02′E. (Schleswig-Holstein) **Germany**

[In]cluding the above, foreign recoveries for this species are now distributed as [fo]llows: Netherlands, three; France, two; Germany, one. All those involved had [be]en ringed in south-eastern England.

Whooper Swan (*Cygnus cygnus*) (2; 5 miles; $1\frac{2}{12}$ years)

?3596	juv.	2.2.63	Shoreham-by-Sea: 50°50′N. 0°16′W. (Sussex) DAS
	×	29.2.64	Hamra: 56°59′N. 18°18′E. (Gotland) **Sweden**

[Th]is is the first foreign recovery of a British-ringed Whooper Swan.

Bewick's Swan (*Cygnus columbianus bewickii*) (2; 5 miles; $2\frac{3}{12}$ years)

Z0726	f.g. ♂	10.2.63	Slimbridge
	released	11.9.63	Slimbridge
	×	19.5.64	*near* Nizh Pesha: 66°47′N. 47°40′E. (Arkhangel) **U.S.S.R.**

This is the first foreign recovery of a British-ringed Bewick's Swan.

Hen Harrier (*Circus cyaneus*) (12; 15 miles; $6\frac{7}{12}$ years)

Two birds of the year, ringed as pulli in Orkney, were recovered in November and December, in Argyll and Perth respectively. A six-year-old one, also ringed as pullus in Orkney, was reported from Banff in early March.

Merlin (*Falco columbarius*) (3; 20 miles; $\frac{10}{12}$ year)

AT68293	pull.	6.7.63	Scalloway: 60°08′N. 1°16′W. (Shetland) PJM
	×	(11.1.64)	*near* Lurgan (Armagh) 430m. SSW.
EC28893	1stW. ♀	7.9.63	Fair Isle
	×	(1.4.64)	Whitehaven (Cumberland) 350m. S.

Kestrel (*Falco tinnunculus*) (34; 150 miles; 3 years)

EC44607	pull.	27.6.64	Colinton: 55°54′N. 3°16′W. (Midlothian) IVBP
	+	23.11.64	Betz Le Chateau: 46°59′N. 0°56′E. (Indre-et-Loire) **France**
3090888	pull.	12.6.64	Chapelknowe: 55°03′N. 3°05′W. (Dumfries) KB
	×	(15.12.64)	Llandybie, Ammanford (Carmarthen) 225m. S.
3023006	pull.	14.6.64	Bassenthwaite: 54°40′N. 3°13′W. (Cumberland) RHB
	+	27.9.64	Beaumont: 49°04′N. 0°47′E. (Eure) **France**
SS28442	pull.	22.6.64	Warcop: 54°31′N. 2°25′W. (Westmorland) RWR
	v	18.10.64	Bradwell-on-Sea (Essex) 240m. SE.
3086050	pull.	2.7.62	Sedbergh: 54°19′N. 2°32′W. (York) SS
	×	1.1.64	Marlow (Buckingham) 205m. SSE.

Water Rail (*Rallus aquaticus*) (4; 5 miles; $\frac{7}{12}$ year)

2037326	f.g. ♂	30.3.64	Dungeness
	×	17.11.64	Llanwenarth, Abergavenny (Monmouth) 180m. WNW.

Moorhen (*Gallinula chloropus*) (39; 50 miles; $11\frac{3}{12}$ years)

AJ32062	juv.	26.8.62	Peakirk: 52°38′N. 0°17′W. (Northampton) WAC
	×	*c.* 10.1.64	Elsham, Brigg (Lincoln) 65m. N.
AJ57941	1stW.	13.10.63	Winchester: 51°04′N. 1°19′W. (Hampshire) WC
	×	2.4.64	Royston (Hertford) 85m. NE.

Coot (*Fulica atra*) (29; 100 miles; $4\frac{4}{12}$ years)

AJ78998	f.g.	12.2.63	Slimbridge
	transp.	12.2.63	Shrawley: 52°17′N. 2°17′W. (Worcester)
	×	30.12.63	Holzhausen: 52°53′N. 8°23′E. (Niedersachsen) **Germany**
AJ78915	f.g.	12.2.63	Slimbridge
	transp.	12.2.63	Shrawley
	×	(14.1.64)	Wootz: 53°04′N. 11°22′E. (Brandenburg) **Germany**
AJ73210	juv.	22.7.64	*near* Southminster: 51°40′N. 0°50′E. (Essex) BBO
	×	(24.9.64)	Martin Dales (Lincoln) 110m. NNW.

0183	ad.	3.11.60	Orielton: 51°40′N. 4°57′W. (Pembroke) WWFS
	+	26.12.64	Illaunmore (Clare) 170m. WNW.
336	f.g.	2.2.63	Chetney Marsh: 51°26′N. 0°44′E. (Kent) MKRG
	+	1.2.64	Tardinghem: 50°51′N. 1°38′E. (Pas-de-Calais) **France**

ots ringed as full-grown at Abberton were recovered as follows:

—Ringed—		—Recovered—	
2914	26.2.62	12.3.64	Bakkum: 52°34′N. 4°40′E. (Noord-Holland) **Netherlands**
2915	27.2.62	(7.3.64)	Rødby Havn: 54°40′N. 11°22′E. (Lolland) **Denmark**
5432	19.12.63	26.12.64	Baie de Somme: *c.* 50°11′N. 1°35′E. (Somme) **France**
6440	31.12.63	23.2.64	Lessay: 49°13′N. 1°32′W. (Manche) **France**

Oystercatcher (*Haematopus ostralegus*) (211; 150 miles; $8\frac{8}{12}$ years)

967	pull.	6.7.64	Fair Isle
	+	11.9.64	Morlaix: 48°35′N. 3°50′W. (Finistère) **France**
004	pull.	21.6.64	Ullapool: 57°54′N. 5°10′W. (Ross) PG
	×	20.8.64	Camaret: 48°16′N. 4°37′W. (Finistère) **France**
65224	pull.	9.7.63	*near* Dalry: 55°10′N. 4°11′W. (Kirkcudbright) MAFF
	×	(21.9.64)	Douarnenez: 48°05′N. 4°20′W. (Finistère) **France**
324	pull.	21.5.64	Skokholm
	×	(9.9.64)	Locquenole: 48°37′N. 3°52′W. (Finistère) **France**

cer-ringed Oystercatchers from the west coast were recovered between May
October in Faeroes (five), Iceland (one) and Norway (three). 32 recoveries at
nces between 150 and 600 miles within the British Isles indicate a southward
ement in winter with a corresponding return to more northerly breeding
nds.

Lapwing (*Vanellus vanellus*) (27; 50 miles; $7\frac{5}{12}$ years)

8	pull.	13.5.61	Wallsend: 55°00′N. 1°31′W. (Northumberland) C&L
	×	15.6.64	Lista: 58°08′N. 6°47′E. (Vest-Agder) **Norway**
	f.g.	31.10.62	*near* Sittingbourne: 51°23′N. 0°43′E. (Kent) MKRG
	+	10.4.64	Lázně Kynzvart: 50°01′N. 12°39′E. **Czechoslovakia**

record from Czechoslovakia is unique. In addition to the above, winter
eries between October and February were reported from France (three),
(five) and Portugal (one). Many fewer Lapwings were recovered abroad
5 than in any of the previous ten years. It is not certain whether this was
the population being depleted by the arctic winter of 1963 or because fewer
ngs than normal emigrated in the mild winters of 1963/64 and 1964/65.

Ringed Plover (*Charadrius hiaticula*) (9; 50 miles, $3\frac{3}{12}$ years)

1	juv.	31.8.61	Fair Isle
	/?/	13.12.64	*near* Rabat: 34°02′N. 6°51′W. **Morocco**
	1stW.	3.1.62	Seahouses: 55°35′N. 1°39′W. (Northumberland) MHBO
	v(=♀)	2.5.64	Påarp: 56°36′N. 12°56′E. (Halland) **Sweden**
8	ad.	6.9.63	Southport: 53°39′N. 3°01′W. (Lancashire) MRG
	×	21.5.64	Powfoot, Annan (Dumfries) 90m. N.
	1stW.	14.9.62	Spurn Point
	+	16.5.64	Blyth (Northumberland) 125m. NW.

CA72827	pull.	3.7.64	Scolt Head: 52°59′N. 0°44′E. (Norfolk) RC
	()	1.9.64	Cap Ferret: 44°42′N. 1°16′W. (Gironde) **France**
CB34697	ad.	6.10.64	*near* Sutton Bridge: 52°44′N. 0°11′E. (Lincoln) WAC
	×	8.11.64	*near* Imfout: 33°15′N. 7°45′W. **Morocco**
52608S	ad.	6.8.61	Walberswick: 52°18′N. 1°41′E. (Suffolk) JN
	+	12.8.64	*near* St. Marie-du-Mont: 49°22′N. 1°10′W. (Manche) **France**

633218 is the first recovery in Sweden of a Ringed Plover marked in Britain.

Little Ringed Plover (*Charadrius dubius*) (3; 30 miles, $3\frac{10}{12}$ years)

CA54559	pull.	13.6.64	*near* Hoddesdon: 51°47′N. 0°00′ (Hertford) RMRG
	+	16.8.64	Aguda: 41°03′N. 8°40′W. (Douro-Litoral) **Portugal**

Grey Plover (*Charadrius squatarola*) (3; 15 miles, $1\frac{1}{12}$ years)

DS14153	ad.	6.9.63	Dawsmere: 52°51′N. 0°07′E. (Lincoln) WWRG
	()	14.3.64	*near* El Merja: 34°25′N. 6°30′W. (Kenitra) **Morocco**

This is the first recovery in Africa of a British-ringed Grey Plover.

Snipe (*Gallinago gallinago*) (45; $5\frac{4}{12}$ years)

Table B—Countries and months of recoveries of Snipe

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Great Britain												
0-25 miles (19)	4	–	1	–	–	–	–	1	3	2	5	3
25+ miles (5)	–	1	–	1	–	–	–	–	–	1	–	2
Ireland (6)	1	–	1	–	–	–	–	–	–	1	1	2
Channel Isles (1)	–	–	–	–	–	–	–	–	–	–	–	1
France (4)	3	1	–	–	–	–	–	–	–	–	–	–
Spain (6)	1	–	–	–	–	–	–	–	–	1	–	4
Sardinia (1)	–	–	–	–	–	–	–	–	–	–	1	–
Italy (1)	–	–	–	–	–	–	–	–	–	–	1	–
Sweden (1)	–	–	–	–	–	–	–	–	1	–	–	–
U.S.S.R. (1)	–	–	–	–	1	–	–	–	–	–	–	–

See footnote to table A

The recoveries in Sweden, Italy and Sardinia are without precedent and are accordingly given in full:

2028428	f.g.	10.9.59	Pity Me: 54°49′N. 1°35′W. (Durham) JCC
	×	5.9.64	Lausviken: 57°17′N. 18°40′E. (Gotland) **Sweden**
CX08296	juv.	1.8.63	Blithfield: 52°49′N. 1°56′W. (Stafford) C&PM
	+	14.11.63	Mapello: 45°42′N. 9°32′E. (Bergamo) **Italy**
S55464	f.g.	24.9.64	*near* Sutton Bridge: 52°44′N. 0°11′E. (Lincoln) MPFE
	+	12.11.64	Oristano: 39°54′N. 8°36′E. **Sardinia**

Jack Snipe (*Lymnocryptes minimus*) (4; 5 miles; $3\frac{1}{12}$ years)

CB37794	f.g.	31.10.64	Holme: 52°58′N. 0°33′E. (Norfolk) HBO
	+	9.12.64	*near* Tunis: 36°50′N. 10°13′E. **Tunisia**

This is the first recovery in Africa of a British-ringed Jack Snipe.

Woodcock (*Scolopax rusticola*) (6; 5 miles; $1\frac{1}{12}$ years)

EC29410	ad.	13.5.64	Fair Isle
	+	20.12.64	*near* Youghal (Cork) 570m. SW.

..1157	pull.	13.5.64	Castor Hanglands: 52°34'N. 0°21'W. (Northampton) C&F
	+	14.11.64	Lisgoold, Midleton (Cork) 330m. W.
..24303	f.g.	6.2.63	Skokholm
	+	30.3.64	Hyrup: 55°15'N. 9°39'E. (Jylland) **Denmark**
..8652	f.g.	5.1.63	Bexhill: 50°50'N. 0°29'E. (Sussex) JAH
	+	5.1.64	Paimpol: 48°47'N. 3°03'W. (Côtes-du-Nord) **France**

Curlew (*Numenius arquata*) (34; 150 miles; $6\frac{5}{12}$ years)

..0905	pull.	9.6.63	Gruinart: 55°48'N. 6°22'W., Islay (Argyll) RTS
	+	8.12.64	Inishmaan, Aran Islands (Galway) 230m. SW.
..18880	pull.	25.5.63	Ingbirchworth: 53°33'N. 1°40'W. (York) ANS
	×	4.4.64	Reenascreena (Cork) 340m. WSW.
..83015	ad.	28.8.61	Dawsmere: 52°51'N. 0°07'E. (Lincoln) WWRG
	+	25.9.64	Petrozavodsk: 61°49'N. 34°20'E. (Karelia) **U.S.S.R.**
..83036	ad.	28.8.61	Dawsmere WWRG
	+	3.8.64	Hojer: 54°58'N. 8°48'E. (Jylland) **Denmark**
..83042	ad.	28.8.61	Dawsmere WWRG
	×	6.7.64	Söderveckoski: 60°23'N. 25°25'E. (Uusimaa) **Finland**
..66540	f.g.	18.8.59	Terrington: 52°47'N. 0°17'E. (Norfolk) WWRG
	×	26.4.64	Wateren: 52°54'N. 6°17'E. (Drenthe) **Netherlands**
..1106	f.g.	11.10.58	Bradwell
	×	6.7.64	Riesbriek: 54°42'N. 9°06'E. (Schleswig-Holstein) **Germany**
..81196	f.g.	5.8.62	Stoke: 51°27'N. 0°38'E. (Kent) NKRG
	+	*early* 1.64	*near* Quimper: 47°52'N. 4°17'W. (Finistère) **France**

..is list includes the first recoveries of British-ringed Curlews in the U.S.S.R. and ..nmark.

Bar-tailed Godwit (*Limosa lapponica*) (3; 5 miles; $2\frac{8}{12}$ years)

..7533	f.g.	15.1.63	Old Leake: 53°04'N. 0°03'E. (Lincoln) WAC
	×	17.2.64	Cleethorpes (Lincoln) 38m. N.
..7969	f.g.	16.4.61	East Tilbury: 51°28'N. 0°26'E. (Essex) ABO
	×	0.1.64	Thouars: 46°59'N. 0°13'W. (Deux-Sèvres) **France**

Green Sandpiper (*Tringa ochropus*) (2; $1\frac{4}{12}$ years)

..39R	f.g.	13.10.63	*near* Sutton Bridge: 52°44'N. 0°11'E. (Lincoln) DS
	+	1.2.64	Parentis-en-Born: 43°58'N. 0°31'W. (Landes) **France**
..02S	juv.	15.8.63	Abingdon: 51°41'N. 1°17'W. (Berkshire) CMR
	+	27.12.64	Liré: 47°21'N. 1°09'W. (Maine-et-Loire) **France**

..ese are the first recoveries of British-ringed Green Sandpipers in France.

Common Sandpiper (*Tringa hypoleucos*) (7; 25 miles; 8 years)

..1605	f.g.	27.8.63	Benacre: 52°21'N. 1°43'E. (Suffolk) AGH
	+	22.9.63	Basauri: 43°13'N. 2°54'W. (Vizcaya) **Spain**
..01257	ad.	14.7.64	Abberton
	+	15.9.64	São João: 11°34'N. 15°25'W. **Portuguese Guinea**

..01257 is the most southerly recovery of a British-ringed Common Sandpiper.

Redshank (*Tringa totanus*) (30; 120 miles; $5\frac{8}{12}$ years)

V32882	pull.	3.6.62	Langdon Beck: 54°41′N. 2°14′W. (Durham) JWA
	+	15.11.64	St. Mary's Bay (Kent) 250m. SE.
43150R	juv.	4.8.62	Shotton: 53°12′N. 3°02′W. (Flint) MRG
	×A	25.6.64	Colintraive (Argyll) 205m. NNW.
CA47081	pull.	21.5.64	Scolt Head: 52°59′N. 0°44′E. (Norfolk) RC
	/?/	15.11.64	Le Conquet: 48°21′N. 4°46′W. (Finistère) **France**
95089X	1stW.	31.8.61	*near* Sutton Bridge: 52°44′N. 0°11′E. (Lincoln) M&B
	v	4.7.64	Amager: 55°38′N. 12°34′E. (Sjaelland) **Denmark**
CA30173	f.g.	21.7.64	Walcot: 52°42′N. 2°32′W. (Shropshire) JML
	+	4.9.64	Vannes: 47°40′N. 2°44′W. (Morbihan) **France**
723864	f.g.	4.3.61	Harty: 51°22′N. 0°55′E., Sheppey (Kent) MKRG
	×A	24.7.64	Cresswell (Northumberland) 290m. NNW.

Knot (*Calidris canutus*) (15; 100 miles; $1\frac{9}{12}$ years)

CX44719	f.g.	6.11.64	West Kirby: 53°22′N. 3°10′W. (Cheshire) MRG
	+	31.12.64	L'Aiguillon: 46°20′N. 1°18′W. (Vendée) **France**
CA30408	f.g.	3.9.64	Benington: 53°00′N. 0°05′E. (Lincoln) JML
	+	10.11.64	Hendaye: 43°22′N. 1°46′W. (Basses-Pyrénées) **France**
CX25893	ad.	4.9.63	Terrington: 52°47′N. 0°17′E. (Norfolk) WWRG
	×	*c.* 14.1.64	Barassie, Troon (Ayr) 280m. NW.

Knots ringed as juveniles on Holbeach Marsh, 52°54′N. 0°04′E. (Lincoln), were recovered as follows, the recoveries in Greenland being unprecedented:

Ringed		*Recovered*	
734282	17.8.62	8.6.64	Crown Prince Island: 69°00′N. 53°20′W. (Godshavn) **Greenland**
734389	3.9.63	28.6.64	Igdlorssuit: 71°15′N. 53°25′W. (Umanak) **Greenland**
CX26710	6.9.63	25.1.64	Llanfair-is-Gaer (Caernarvon) 185m. W.
CX26985	6.9.63	5.3.64	Bognor Regis (Sussex) 145m. S.

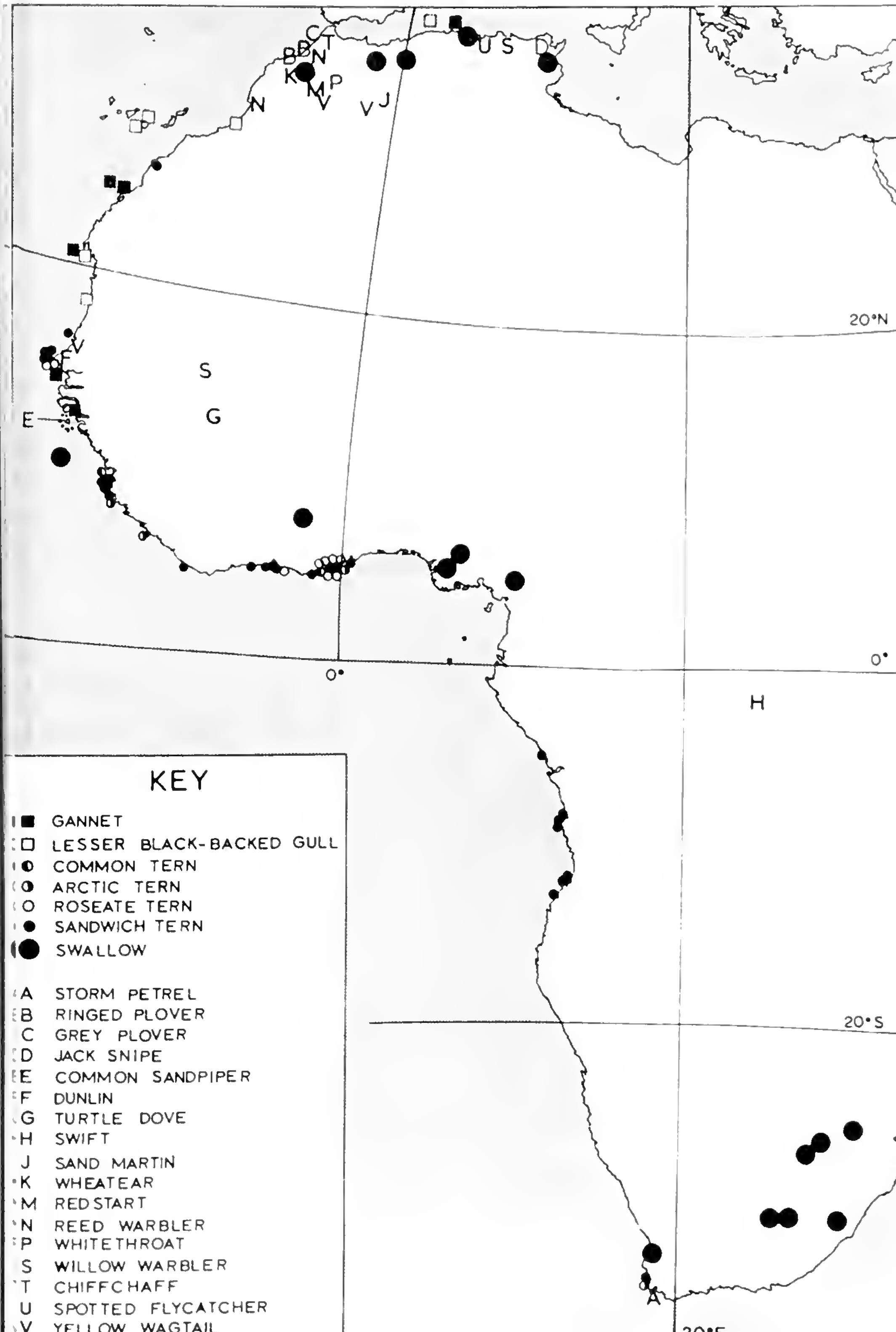
Dunlin (*Calidris alpina*) (121; $5\frac{11}{12}$ years)

Table C—Countries and months of recoveries of Dunlin

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Great Britain												
0-50 miles (62)	7	2	4	1	–	–	2	4	15	11	9	7
50+ miles (6)	1	1	–	1	–	1	–	1	–	1	–	–
Sénégal (1)	–	–	–	–	–	–	–	–	–	1	–	–
Portugal (5)	–	–	–	–	–	–	–	1	3	1	–	–
Spain (1)	–	–	–	–	–	–	–	–	–	1	–	–
France (14)	1	1	2	1	1	–	–	3	1	–	2	2
Germany (4)	–	–	–	–	1	–	–	2	1	–	–	–
Denmark (5)	–	–	–	–	–	1	–	3	1	–	–	–
Iceland (1)	–	–	–	–	–	1	–	–	–	–	–	–
Sweden (16)	–	–	–	–	–	–	10	5	1	–	–	–
Poland (1)	–	–	–	–	–	–	1	–	–	–	–	–
Finland (1)	–	–	–	–	–	–	1	–	–	–	–	–
U.S.S.R. (4)	–	–	–	–	–	1	–	–	3	–	–	–

See footnote to table A

21525S	ad.	7.5.61	Foulness: 51°37′N. 0°57′E. (Essex) GD
	×	11.6.64	Brekka: 65°50′N. 17°22′W., Adaldalur, **Iceland**



MAP 3. All recoveries reported from Africa during the period covered by this report, omitting only nine Lesser Black-backed Gulls *Larus fuscus* and two Gannets *Sula bassana* in Morocco (*drawn by C. J. Mead*)

635080	f.g.	15.3.62	East Tilbury: 51°28′N. 0°26′E. (Essex) ABO
	v	4.8.62	Ottenby: 56°12′N. 16°24′E. (Öland) **Sweden**
	v	20.10.62	East Tilbury
	v	18.11.64	East Tilbury
635181	f.g.	20.10.62	East Tilbury ABO
	v	27.7.64	Mikoszewo: 54°27′N. 18°57′E. (Gdańsk) **Poland**
BA40527	f.g.	10.12.63	East Tilbury ABO
	+	6.6.64	Zapolyarnyy: 67°29′N. 63°45′E. (Komi) **U.S.S.R.**
BA20244	1stW.	26.11.62	*near* Sittingbourne: 51°23′N. 0°43′E. (Kent) MKRG
	+	15.9.64	Lake Ilmen: *c.* 58°20′N. 31°20′E. (Novgorod) **U.S.S.R.**
BA32380	ad.	28.10.63	*near* Sittingbourne MKRG
	+	4.9.64	Solnechnogorsk: 56°12′N. 36°58′E. (Moscow) **U.S.S.R.**
BA32480	1stW.	12.2.64	*near* Sittingbourne MKRG
	+	1.9.64	*near* Lebedyan′: 53°01′N. 39°07′E. (Lipetsk) **U.S.S.R.**
69554R	f.g.	30.8.64	Hayle: 50°10′N. 5°25′W. (Cornwall) CJB
	×	4.10.64	Cap Vert: 14°43′N. 17°33′W. (Dakar) **Sénégal**

69554R is by far the most southerly recovery ever recorded for a British-ringed Dunlin and BA40527 is much the most easterly. Recoveries in Iceland and the eastern Baltic region are very infrequent. It is interesting to note that the eastern recoveries were all of birds ringed in the Thames estuary.

Ruff (*Philomachus pugnax*) (4; 5 miles; $2\frac{5}{12}$ years)

2013469	ad. ♂	12.8.61	*near* Sutton Bridge: 52°44′N. 0°11′E. (Lincoln) M&B
	×	12.1.64	Cliffe (Kent) 87m. S.
2068125	juv. ♂	9.9.63	Abingdon: 51°41′N. 1°17′W. (Berkshire) CMR
	+	14.5.64	Kholmogory: 64°12′N. 40°44′E. (Arkhangel) **U.S.S.R.**
DS15307	ad. ♂	11.7.64	Stoke: 51°27′N. 0°38′E. (Kent) NKRG
	v	8.8.64	Stoke
	+	11.9.64	Soustons: 43°45′N. 1°19′W. (Landes) **France**

Stone Curlew (*Burhinus oedicnemus*) (1; $1\frac{2}{12}$ years)

3059962	pull.	26.5.63	Icklingham: 52°20′N. 0°36′E. (Suffolk) SKT
	×	(20.8.64)	Boulogne: 50°43′N. 1°37′E. (Pas-de-Calais) **France**

Arctic Skua (*Stercorarius parasiticus*) (4; 5 miles; $8\frac{1}{12}$ years)

3075636	pull. ♀	18.7.56	Fair Isle
	v	14.6.60	Fair Isle
	×	*c.* 19.8.64	Winterton-on-Sea (Norfolk) 490m. SSE.
3075743	ad.	9.7.60	Fair Isle
	×	8.9.64	*near* Aberdeen 160m. S.
AT77259	pull.	17.7.61	Fair Isle
	×	(30.9.64)	Wilhemshaven: 53°32′N. 8°14′E. (Niedersachsen) **Germany**

Great Skua (*Catharacta skua*) (19; 5 miles; 4 years)

AJ71295	pull.	1.8.63	Hermaness: 60°52′N. 0°53′W. (Shetland) JGW
	()	15.5.64	Islas Sisargas: 43°22′N. 8°50′W. (Coruña) **Spain**
HW01345	pull.	8.7.64	Hermaness RWJS
	×	*mid* 10.64	Tauscha: 50°55′N. 12°44′E. (Sachsen) **Germany**
417301	pull.	12.7.64	Unst: 60°45′N. 0°50′W. (Shetland) FIBO
	+	*end* 12.64	Fuenterrabia: 43°21′N. 1°48′W. (Guipúzcoa) **Spain**

163311	pull.	8.7.62	Noss: 60°08′N. 1°01′W. (Shetland) CJB
	v	24.7.64	*off* Wick (Caithness) 140m. SW.

rreat Skuas ringed as pulli on Foula, 60°08′N. 2°05′W. (Shetland), were recovered follows:

Ringed		*Recovered*	
15207	21.7.60	12.8.64	*off* Sunderland (Durham) 360m. S.
6065	28.7.61	26.2.64	Narssaq: 61°00′N. 46°00′W. (Julianehåb) **Greenland**
6448	18.7.62	23.6.64	*off* Strathy Point (Sutherland) 125m. SW.
11006	2.8.63	(3.9.64)	Sezimbra: 38°26′N. 9°06′W. (Estremadura) **Portugal**
11018	2.8.63	(3.9.64)	Sezimbra, **Portugal**
11562	31.7.64	0.10.64	Kampen: 52°33′N. 5°55′E. (Overijssel) **Netherlands**
11668	1.8.64	8.11.64	Sallenelles: 49°16′N. 0°13′W. (Calvados) **France**
11635	4.8.64	0.11.64	River Seine: *c.* 49°30′N. 0°12′E. (Seine-Maritime) **France**

ote the identical ringing and recovery details for 421006 and 421018.

Great Black-backed Gull (*Larus marinus*) (61; $7\frac{4}{12}$ years)

8018	1stW.	13.12.61	Fair Isle
	×	0.8.64	Ho Bugt: 55°34′N. 8°15′E. (Jylland) **Denmark**
2513	pull.	5.7.63	Skerries: 55°14′N. 6°37′W. (Antrim) CMR
	×	3.7.64	La Barre de Monts: 46°52′N. 2°07′W. (Vendée) **France**
5744	pull.	27.6.64	Annet: 49°54′N. 6°22′W., Scilly (Cornwall) SABO
	/ ?/	15.10.64	Penmarch: 47°49′N. 4°22′W. (Finistère) **France**
5680	pull.	22.6.64	Rosevear: 49°52′N. 6°24′E., Scilly (Cornwall) SABO
	×	(2.10.64)	Ile de Sein: 48°02′N. 4°51′W. (Finistère) **France**

nly four recoveries within the British Isles showed movements greater than 100 iles.

Lesser Black-backed Gull (*Larus fuscus*) (205; 7 years)

nree recoveries from unusual localities are published below in full. 86 other reign recoveries from much-frequented places will be tabulated in a future report.

82126	pull.	23.6.63	Walney: 54°05′N. 3°15′W. (Lancashire) RGBB
	()	*c.* 15.2.64	Las Palmas: 28°08′N. 15°27′W. **Canary Islands**
M16845	pull.	6.7.64	Walney MBRG
	v	(17.12.64)	Las Palmas, **Canary Islands**
85467	pull.	28.7.63	*near* Lancaster: 54°03′N. 2°35′W. (Lancashire) PJM
	()	1.3.64	*off* Oran: 36°22′N. 1°10′W. **Algeria**

Herring Gull (*Larus argentatus*) (267; 11 years)

87433	juv.	16.7.64	Newborough: 53°10′N. 4°22′W. (Anglesey) PHJ
	+	17.12.64	Ménéac: 48°08′N. 2°27′W. (Morbihan) **France**
88123	pull.	12.7.64	Annet: 49°54′N. 6°22′W. Scilly (Cornwall) SABO
	()	*c.* 1.11.64	La Turballe: 47°21′N. 2°30′W. (Loire-Atlantique) **France**

ere were 28 movements in excess of 100 miles within the British Isles, the longest ng by one ringed as pullus on Mousa (Shetland) and recovered 430 miles south Blackpool (Lancashire).

Common Gull (*Larus canus*) (8; 60 miles; $1\frac{11}{12}$ years)

AT92071	pull.	20.7.64	Tighnabruaich: 55°56′N. 5°14′W. (Argyll) NSRG
	+	0.12.64	Golegã: 39°24′N. 8°29′W. (Ribatejo) **Portugal**
3017870	ad.	24.1.63	Littlestone: 50°59′N. 0°58′E. (Kent) DBO
	×	(25.8.64)	Stollhamm: 53°32′N. 8°22′E. (Niedersachsen) **Germany**

Recoveries of British-bred Common Gulls in southern Europe are very exceptional.

Black-headed Gull (*Larus ridibundus*) (222; 14 years)

Twenty-four foreign recoveries of winter-ringed Black-headed Gulls will be tabulated in a future report. Given in full are all foreign recoveries, and all records showing movements over 200 miles, of British-ringed pulli.

3015352	pull.	11.7.57	Cobbinshaw: 55°48′N. 3°34′W. (Midlothian) RWJS
	()	22.12.64	Carril: 42°36′N. 8°46′W. (Pontevedra) **Spain**
SS10524	pull.	15.6.63	*near* Sutton Bridge: 52°44′N. 0°11′E. (Lincoln) JHP
	+	(12.11.64)	Waterville (Kerry) 440m. W.
EC44781	pull.	13.6.64	Cliffe: 51°28′N. 0°30′E. (Kent) NKRG
	v	2.11.64	Bardsey (Caernarvon) 240m. WNW.
3025303	pull.	1.6.57	Lower Halstow: 51°22′N. 0°42′E. (Kent) PRG
	×	(7.12.64)	Speke, Liverpool (Lancashire) 200m. NW.
3069257	pull.	3.6.61	Sharfleet: 51°22′N. 0°48′E., Sheppey (Kent) NKRG
	×	(5.10.64)	Curragh (Kildare) 345m. WNW.
3083977	pull.	1.7.61	Sharfleet NKRG
	×	*c.* 5.2.64	St. Rogatien: 46°10′N. 1°04′W. (Charente-Maritime) **France**
EC29192	pull.	25.6.62	Keyhaven: 50°43′N. 1°34′W. (Hampshire) M&B
	×	27.1.64	St. Amand: 50°27′N. 3°26′E. (Nord) **France**

Kittiwake (*Rissa tridactyla*) (50; 8 years)

Table D—Countries and months of recoveries of Kittiwakes

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
British Isles												
0-100 miles (22)	–	1	1	2	3	5	6	4	–	–	–	–
100+ miles (8)	–	2	–	2	–	2	2	–	–	–	–	–
France (1)	–	–	–	–	–	–	–	–	–	–	1	–
Netherlands (2)	–	–	–	–	1	1	–	–	–	–	–	–
Germany (2*)	–	–	–	–	–	–	–	–	–	–	1	–
Denmark (1)	–	–	–	–	–	1	–	–	–	–	–	–
Greenland (8*)	–	–	–	–	–	–	1	2	–	4	–	–
Newfoundland (6*)	1	–	–	–	–	–	–	–	–	4	–	–

*Total includes undated records
See footnote to table A

Common Tern (*Sterna hirundo* (11; 60 miles; $6\frac{11}{12}$ years)

CX08286	pull.	4.7.63	Loch Borralie: 58°34′N. 4°48′W. (Sutherland) C&PM
	v	(7.9.64)	Bonyere: 5°01′N. 2°43′W., Beyin, **Ghana**
CA29045	pull.	23.7.63	Kinnegar: 54°38′N. 5°51′W. (Down) W&E
	×	14.2.64	Freetown: 8°30′N. 13°17′W. **Sierra Leone**
CA47177	pull.	30.6.64	Scolt Head: 52°59′N. 0°44′E. (Norfolk) RC
	×	2.9.64	Areia Branca: 39°15′N. 9°20′W. (Estremadura) **Portugal**
CB02998	pull.	14.7.64	Tollesbury: 51°46′N. 0°50′E. (Essex) AJW
	()	12.9.64	Faro: 37°01′N. 7°56′W. (Algarve) **Portugal**

Arctic Tern (*Sterna macrura*) (23; 200 miles; 16 years)

A56528	pull.	30.7.63	*near* Forres: 57°39′N. 3°40′W. (Moray) PG
	v	20.3.64	Accra: 5°33′N. 0°15′W. **Ghana**
X43383	pull.	27.6.64	Valley: 53°17′N. 4°34′W. (Anglesey) MRG
	×	(3.9.64)	Freetown: 8°30′N. 13°17′W. **Sierra Leone**

ulli ringed on the Farne Islands were recovered as follows:

Ringed		Recovered	
0854	9.7.60	0.6.64	Vaulen: 58°56′N. 5°45′E. (Rogaland) **Norway**
K10843	10.7.62	*c.* 25.6.64	Kilchattan Bay (Bute) 130m. W.
K10474	23.7.62	22.10.64	Bantry Bay: 33°55′S. 18°23′E. **South Africa**
K36263	4.7.64	15.8.64	Monrovia: 6°20′N. 10°46′W. **Liberia**
K34525	4.7.64	26.8.64	Guéthary: 43°25′N. 1°36′W. (Basses-Pyrénées) **France**

Roseate Tern (*Sterna dougallii*) (12; 5 miles; $2\frac{1}{12}$ years)

K08993	pull.	30.6.62	(Wexford) DC
	v	20.8.64	Seagry, Chippenham (Wiltshire) *c.* 190m. E.

n addition to the above, two were recovered in Sénégal in May, one in the Ivory coast in April, and four and two in Ghana in February and April respectively.

Sandwich Tern (*Sterna sandvicensis*) (74; $6\frac{11}{12}$ years)

066240	pull.	19.7.61	Inchmickery: 56°02′N. 3°08′W. Firth of Forth MOC
	+	22.5.64	San Ferdinando: 38°29′N. 15°55′E. (Reggio di Calabria) **Italy**
117539	pull.	4.7.60	Farne Islands
	×	21.6.64	La Palissade: 43°20′N. 4°50′E. (Bouches-du-Rhône) **France**
S01119	pull.	1.7.61	Farne Islands
	+	21.6.64	Hendorf: 46°04′N. 24°50′E. (Brasov) **Rumania**

orty-five recoveries in western Europe and Africa will be tabulated in a future eport.

Razorbill (*Alca torda*) (21; 150 miles; $9\frac{10}{12}$ years)

T90146	pull.	4.7.62	Fair Isle
	×	29.6.64	Lokken: 57°22′N. 9°44′E. (Jylland) **Denmark**
05918	pull.	25.6.64	Fair Isle
	+	11.10.64	Stavfjorden: 61°28′N. 4°50′E. (Sogn-og-Fjordane) **Norway**
505919	pull.	25.6.64	Fair Isle
	+	6.11.64	*off* Stavanger: *c.* 59°00′N. 5°30′E. (Rogaland) **Norway**
T77753	pull.	25.6.61	Calf of Man
	+	(31.3.64)	*near* Denia: 38°48′N. 0°12′E. (Alicante) Spain
T83465	pull.	2.7.62	Puffin Island: 53°19′N. 4°01′W. (Anglesey) MRG
	×	27.3.64	Biarritz: 43°29′N. 1°34′W. (Basses-Pyrénées) **France**
T61602	pull.	4.7.58	Menavaur: 49°58′N. 6°19′W., Scilly (Cornwall) BE
	×	20.6.64	Siouville: 49°35′N. 1°52′W. (Manche) **France**

Razorbills ringed on Skokholm and the neighbouring island of Skomer were recovered as follows:

Ringed		Recovered	
*AT70612**	23.6.55	0.11.63	Mimizan-Plage: 44°13'N. 1°18'W. (Landes) **France**
AT84502	28.6.62	16.12.64	Ouistreham: 49°16'N. 0°15'W. (Calvados) **France**
AT84851	4.7.62	4.2.64	Cádiz: 36°32'N. 6°18'W. **Spain**
SS11765	10.7.63	2.2.64	Denia: 38°51'N. 0°07'E. (Alicante) **Spain**
SS23082	1.7.64	14.11.64	Las Arenas: 43°20'N. 3°00'W. (Vizcaya) **Spain**

*Ringed as adult; the remainder were ringed as pulli

Guillemot (*Uria aalge*) (21; 100 miles; $6\frac{9}{12}$ years)

AT90688	pull.	20.7.62	Fair Isle
	×	*c.* 15.3.64	Sigerfjord: 68°40'N. 15°33'E. (Nordland) **Norway**
SS22516	pull.	1.7.64	Fair Isle
	+	27.9.64	*off* Bomlo: 59°44'N. 4°58'E. (Hordaland) **Norway**
AT59682	pull.	7.7.63	Isle of May
	/?/	26.3.64	Par (Cornwall) 410m. SSW.
AT59686	pull.	7.7.63	Isle of May
	×	8.2.64	Ostend: 51°13'N. 2°55'E. (West Flanders) **Belgium**
AJ53265	pull.	17.7.64	Farne Islands
	+	3.10.64	Oslofjord: *c.* 58°50'N. 10°30'E. **Norway**
AT91306	pull.	16.7.63	Rathlin: 55°18'N. 6°12'W. (Antrim) NDMc
	×	13.3.64	Thurlestone, Kingsbridge (Devon) 360m. SSE.
3055233	pull.	11.7.58	Skomer: 51°44'N. 5°19'W. (Pembroke) SkBO
	+	(6.12.64)	*off* **Gibraltar**: 36°09'N. 5°20'W.
AT61584	pull.	4.7.58	Menavaur: 49°58'N. 6°19'W., Scilly (Cornwall) BE
	×	18.4.64	Rade de Brest: 48°21'N. 4°30'W. (Finistère) **France**

Puffin (*Fratercula arctica*) (20; 100 miles; 11 years)

AX9600	ad.	19.4.54	Farne Islands
	×	(14.9.64)	Blackdog (Aberdeen) 110m. N.
3052803	ad.	1.5.59	Farne Islands
	×	1.3.64	Bridlington (Yorkshire) 120m. SSE.

Woodpigeon (*Columba palumbus*) (83; 40 miles; $9\frac{3}{12}$ years)

SS05255	ad.	13.7.63	Fair Isle
	×	12.5.64	Hörnum: 54°48'N. 8°18'E., Sylt, **Germany**

This is the first recovery of a British-ringed Woodpigeon in Germany.

Turtle Dove (*Streptopelia turtur*) (10; 30 miles; 4 years)

2031762	ad.	5.7.63	Colsterworth: 52°48'N. 0°37'W. (Lincoln) LC
	+	(7.9.64)	Ste. Marie: 46°09'N. 1°18'W., Ile de Ré (Charente-Maritime) **France**
2037512	pull.	6.7.61	Peakirk: 52°38'N. 0°17'W. (Northampton) WAC
	+	7.9.64	Bouliac: 44°54'N. 0°30'W. (Gironde) **France**
2065360	ad.	4.7.63	Gooderstone: 52°35'N. 0°36'E. (Norfolk) CBO
	×	18.9.64	Tarnos: 43°33'N. 1°27'W. (Landes) **France**
2030355	ad.	15.5.60	Waldringfield: 52°03'N. 1°19'E. (Suffolk) PRC
	v	27.5.62	Waldringfield
	×	15.5.64	Golegã: 39°24'N. 8°29'W. (Ribatejo) **Portugal**

073747	ad.	13.7.63	Abberton
	+	(6.4.64)	*near* Bamako: 12°40′N. 7°59′W. **Mali**
011080	f.g.	1.7.64	Stockbury: 51°20′N. 0°41′E. (Kent) MKRG
	+	10.9.64	Torreira: 40°45′N. 8°42′W. (Beira-Litoral) **Portugal**
031592	pull.	9.7.61	Blashford: 50°52′N. 1°47′W. (Hampshire) JW
	+	12.9.64	*near* Santarém: 39°18′N. 8°38′W. (Ribatejo) **Portugal**

073747 is the first British-ringed Turtle Dove to be recovered in or near its winter uarters.

Cuckoo (*Cuculus canorus*) (5; 70 miles; $3\frac{10}{12}$ years)

007300	pull.	23.6.64	Carnwath: 55°43′N. 3°38′W. (Lanark) IVBP
	+	5.9.64	Cavallino di Urbino: 43°47′N. 12°37′E. (Pesaro) **Italy**
70631	pull.	17.6.64	Clifton Hampden: 51°39′N. 1°13′W. (Oxford) OOS
	×	2.8.64	Lumby: 55°28′N. 10°20′E. (Fyn) **Denmark**

Long-eared Owl (*Asio otus*) (1; 8 days)

S22793	f.g.	1.11.64	Fair Isle
	×	8.11.64	Zandvoort: 52°22′N. 4°31′E. (Noord-Holland) **Netherlands**

Swift (*Apus apus*) (114; 70 miles; $15\frac{11}{12}$ years)

C08133	ad.	29.7.62	Ilkley: 53°56′N. 1°49′W. (York) WNS
	+	(19.10.64)	Villarrasa: 37°23′N. 6°36′W. (Huelva) **Spain**
C63614	ad.	15.6.64	Marston: 52°59′N. 0°41′W. (Lincoln) WMP
	×	23.8.64	Bollullos: 37°20′N. 6°32′W. (Huelva) **Spain**
C50057	ad.	12.5.63	Hoddesdon: 51°47′N. 0°00′ (Hertford) RMRG
	×	22.8.64	Montélimar: 44°33′N. 4°45′E. (Drôme) **France**
C50858	ad.	16.6.63	Hoddesdon RMRG
	×	(14.5.64)	Broadway (Worcester) 80m. W.
C54088	ad.	23.6.63	Hoddesdon RMRG
	v	13.5.64	Rossington, Doncaster (York) 125m. NNW.
C54263	ad.	29.6.63	Hoddesdon RMRG
	()	0.4.64	*near* Lodja: 3°30′S. 23°23′E. (Sankuru) **Congo**

Swallow (*Hirundo rustica*) (343; $4\frac{1}{12}$ years)

Table E—Countries and months of recoveries of Swallows

untry of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
itish Isles												
0-5 miles (134)	–	–	–	1	13	30	32	36	22	–	–	–
6-100 miles (153)	1	–	–	1	10	14	14	40	73	–	–	–
100+ miles (22)	–	–	–	–	3	1	2	3	13	–	–	–
nland (1)	–	–	–	–	–	1	–	–	–	–	–	–
therlands (1)	–	–	–	–	–	1	–	–	–	–	–	–
ance (8)	–	–	–	–	1	–	–	–	1	6	–	–
ain (4)	–	–	–	–	–	–	–	–	–	4	–	–
learic Is. (2)	–	–	–	–	–	–	–	–	–	2	–	–
geria (2)	–	–	–	–	–	–	–	–	–	2	–	–
nisia (1)	–	–	–	–	–	–	–	–	–	1	–	–
orocco (2)	–	–	–	–	–	–	–	–	–	2	–	–
hana (1)	1	–	–	–	–	–	–	–	–	–	–	–
geria (2)	–	–	–	–	–	–	–	–	–	1	1	–
meroon (1)	–	–	–	–	–	–	–	–	–	–	1	–
uth Africa (7)	–	5	–	–	–	–	–	–	–	–	–	2

See footnote to table A

The following recoveries at sea are of special interest:

SC73364	juv.	8.9.63	Wood Dalling: 52°48′N. 1°06′E. (Norfolk) JAS
	×	6.6.64	SW of Ireland: 48°53′N. 11°46′W. *c.* 520m. WSW.
AK55216	juv.	9.9.63	Rainham: 51°32′N. 0°12′E. (Essex) CEJC
	×	29.4.64	*off* **French Guinea**: 9°59′N. 16°18′W.

House Martin (*Delichon urbica*) (31; 60 miles; $3\frac{2}{12}$ years)

SC53992	juv.	20.9.64	Bishop's Stortford: 51°53′N. 0°09′E. (Hertford) RBN
	×	12.10.64	Toulouse: 43°37′N. 1°26′E. (Haute-Garonne) **France**

Unlike the spectacular successes with other hirundines, it has not as yet proved possible to develop House Martin ringing. Few recoveries are reported (this is the first from France for over ten years) and the movements of the species are still little known.

Sand Martin (*Riparia riparia*) (1,376; 7 years)

The Trust's special Sand Martin enquiry continued during 1964 and there was a further big increase in the number of recoveries, the great majority being live recaptures. Within the British Isles there were 187 movements of between 100 and 200 miles, 32 of between 200 and 300 miles and 12 of between 300 and 485 miles. No fewer than 34 foreign recoveries were reported and these are summarised in table F.

Table F—Countries and months of recoveries of Sand Martins

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Germany (2)	–	–	–	–	–	–	2	–	–	–	–	–
France (23)	–	–	–	–	–	–	–	19	4	–	–	–
Spain (8)	–	–	2	–	1	1	–	–	3	1	–	–
Algeria (1)	–	–	1	–	–	–	–	–	–	–	–	–

See footnote to table A

Of the 23 recoveries in France, no fewer than 18 were controlled at roosts by French ringers—an excellent example of international co-operation. The full details of the German and Algerian recoveries are as follows:

N44340	juv.	30.7.63	Prudhoe: 54°57′N. 1°51′W. (Northumberland) NRG
	×	0.7.64	Amrum: 54°40′N. 8°20′E., North Frisian Is., **Germany**
N15128	juv.	3.9.62	Chichester: 50°50′N. 0°48′W. (Sussex) M&B
	×	23.7.64	Borkum: 53°35′N. 6°40′E., East Frisian Is., **Germany**
N62502	ad.	22.8.63	Chichester CHI
	×	31.3.64	Djenane ed Dar: 32°01′N. 1°15′W. **Algeria**

Rook (*Corvus frugilegus*) (59; 30 miles; $4\frac{2}{12}$ years)

3054444	1stW.	19.2.63	Durham: 54°47′N. 1°34′W. JCC
	/?/	23.10.64	Longframlington (Northumberland) 37m. N.

Jackdaw (*Corvus monedula*) (41; 20 miles; $10\frac{1}{12}$ years)

3075164	pull.	10.6.60	Bardsey
	×	23.2.64	Enfield (Meath) 95m. WNW.

Magpie (*Pica pica*) (24; 10 miles; $5\frac{11}{12}$ years)

EC00443	juv.	19.7.63	Knaresborough: 54°01′N. 1°28′W. (York) KRS
	×	(9.4.64)	Sessay, Thirsk (York) 13m. NE.

Great Tit (*Parus major*) (167; 30 miles; $8\frac{1}{12}$ years)

..07878	juv.	12.8.64	Abberton
	v	21.11.64	Havering (Essex) 32m. WSW.
.64206	pull.	3.6.64	Wytham: 51°47′N. 1°19′W. (Berkshire) EGI
	×	*c.* 18.12.64	Aspley Guise (Buckingham) 33m. NE.
H35084	ad. ♀	6.12.63	Wilmington: 50°49′N. 0°12′E. (Sussex) RHC
	v	15.4.64	Brussegem: 50°56′N. 4°16′E. (Brabant) **Belgium**
.712	f.g. ♀	9.12.63	Sidmouth: 50°41′N. 3°14′W. (Devon) DRW
	×	10.7.64	Chute, Andover (Hampshire) 80m. ENE.

Blue Tit (*Parus caeruleus*) (401; 30 miles; $9\frac{8}{12}$ years)

.64703	1stW.	7.1.64	Jordanhill: 55°53′N. 4°21′W., Glasgow WUF
	v	7.4.64	Kirkliston (West Lothian) 38m. E.
.33235	1stW.	4.10.64	Grune Point: 54°54′N. 3°21′W. (Cumberland) RS
	v	5.12.64	Hawthorn, Seaham (Durham) 78m. E.
H25219	f.g.	4.5.64	Peakirk: 52°38′N. 0°17′W. (Northampton) WAC
	×	2.12.64	Haxey, Epworth (Lincoln) 62m. NNW.
.33244	ad.	15.6.63	Kemerton: 52°02′N. 2°05′W. (Worcester) C&PM
	v (=♂)	6.4.64	Wytham (Berkshire) 38m. ESE.
H72714	1stW.	1.2.61	Oxford: 51°45′N. 1°16′W. OOS
	×	(3.5.64)	*near* Corby (Northampton) *c.* 55m. NNE.
H05860	juv.	29.8.64	Woldingham: 51°17′N. 0°02′W. (Surrey) GRM
	/?/	3.12.64	Farnborough (Hampshire) 32m. W.
.78096	pull.	8.6.63	Farnham: 51°13′N. 0°48′W. (Surrey) PGD
	×	28.2.64	Laycock (Wiltshire) 58m. W.
H95009	f.g.	28.11.63	Frensham: 51°10′N. 0°48′W. (Surrey) PGD
	×	(7.4.64)	East Grinstead (Sussex) 34m. E.

Long-tailed Tit (*Aegithalos caudatus*) (9; 10 miles; $\frac{10}{12}$ year)

.33867	f.g.	25.10.64	Askwith: 53°56′N. 1°44′W. (York) CGB
	v	10.12.64	Spurn Point 75m. E.
H60689	f.g.	29.12.63	Goostrey: 53°14′N. 2°20′W. (Cheshire) S&B
	×	(30.6.64)	Romiley, Stockport (Cheshire) 18m. NE.

Treecreeper (*Certhia familiaris*) (2; 3 miles; $\frac{5}{12}$ year)

.78625	f.g.	21.3.64	Lane End: 51°37′N. 0°48′W. (Buckingham) SBRG
	×	8.4.64	Thame (Oxford) 10m. NW.

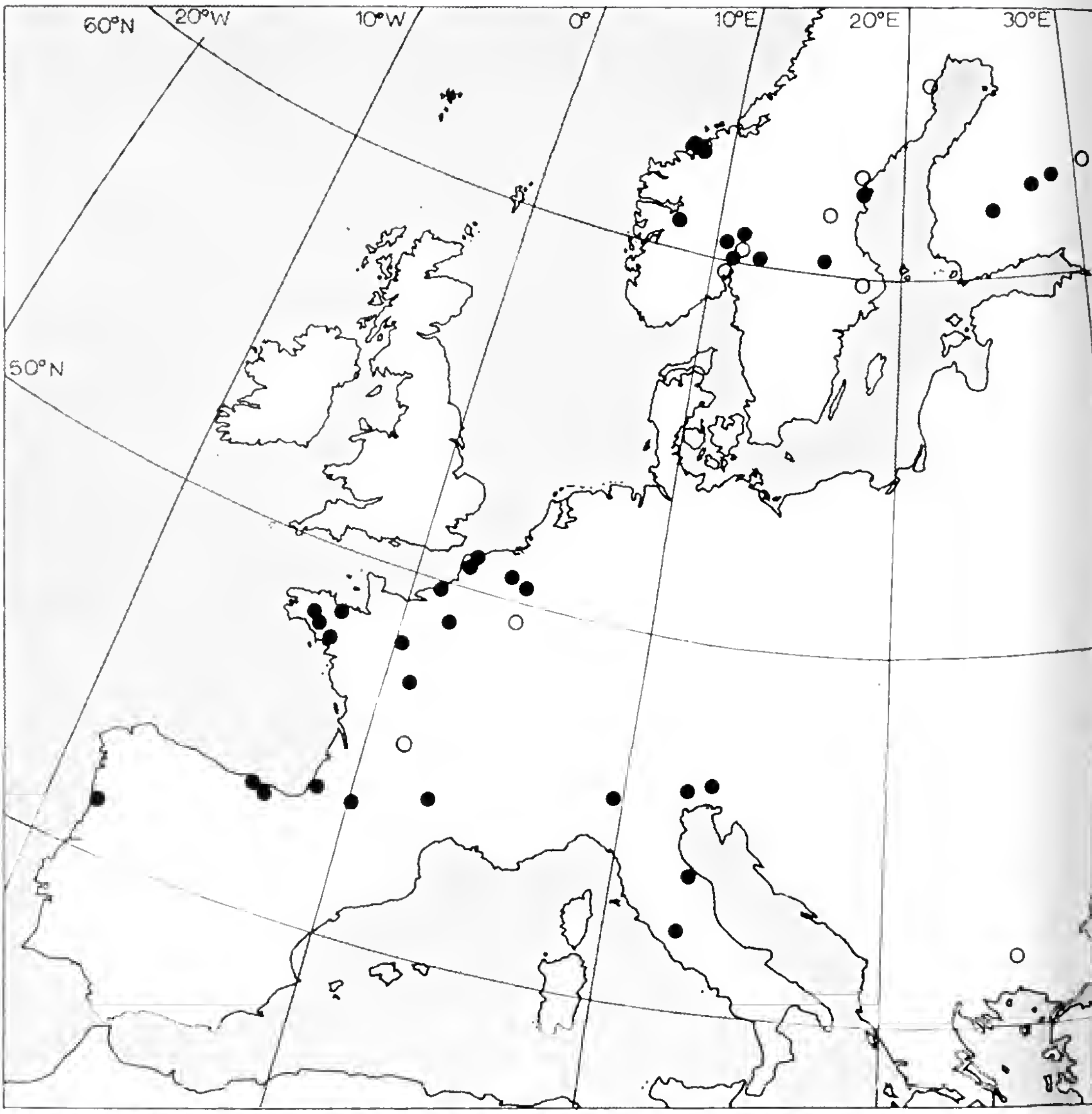
.is is the longest movement ever recorded for a British-ringed Treecreeper.

Mistle Thrush (*Turdus viscivorus*) (22; 20 miles; $4\frac{9}{12}$ years)

.932	pull.	17.4.61	Witham Friary: 51°10′N. 2°22′W. (Somerset) JCCO
	v	13.5.64	Christchurch (Hampshire) 38m. SE.

Fieldfare (*Turdus pilaris*) (18; 5 miles; $3\frac{2}{12}$ years)

.98R	1stW. ♀	26.11.62	Carnforth: 54°08′N. 2°46′W. (Lancashire) WP&M
	×	7.7.64	Mjondalen: 59°43′N. 10°10′E. (Buskerud) **Norway**
.73R	1stW. ♂	11.12.62	Carnforth WP&M
	+	9.3.64	Allassac: 45°16′N. 1°28′E. (Corrèze) **France**



MAP 4. All foreign recoveries so far reported of Fieldfares *Turdus pilaris*; recoveries mentioned in this report are marked by open circles and previous ones by solid dots (*drawn by R. C. Faulkner*)

88595R	ad.	23.2.63	Rossington: 53°29′N. 1°04′W. (York) RM
	+	18.5.64	Knivsta: 59°43′N. 17°50′E. (Stockholm) **Sweden**
41266X	1stW.	26.2.61	Killamarsh: 53°19′N. 1°19′W. (Derby) SNHS
	×	11.5.64	Norrlångträsk: 65°01′N. 20°44′E. (Västerbotten) **Sweden**
71089R	1stW. ♂	4.12.62	Brancaster: 52°58′N. 0°38′E. (Norfolk) TFR
	×	20.5.64	Härnösand: 62°38′N. 17°56′E. (Väster-Norrland) **Sweden**
CA90030	ad. ♂	4.1.64	Brancaster TFR
	+	6.9.64	Hamar: 60°57′N. 10°55′E. (Hedmark) **Norway**
CA78095	ad. ♀	5.1.64	Holbeach: 52°49′N. 0°01′E. (Lincoln) RKS
	+	(1.12.64)	Origny: 49°54′N. 4°02′E. (Aisne) **France**
CX02702	1stW.	17.2.63	Hinckley: 52°33′N. 1°:1′W. (Leicester) HL
	×	27.7.64	Eno: 62°45′N. 30°15′E. (Kuopio) **Finland**

149R ad. ♀ 3.2.63 Bloxham: 52°01′N. 1°23′W. (Oxford) MJDH
× 23.4.64 Hedsta: 61°54′N. 15°54′E. (Hälsingland) **Sweden**

79R f.g. 12.1.63 Burgess Hill: 50°57′N. 0°08′W. (Sussex) JAW
+ 0.1.64 Ardino: 41°36′N. 25°08′E. (Khaskovo) **Bulgaria**

79R is the first British-ringed Fieldfare to be recovered in Bulgaria.

Song Thrush (*Turdus philomelos*) (306; 100 miles; $8\frac{1}{12}$ years)

681 ad. 18.2.60 Lisburn: 54°31′N. 6°02′W. (Antrim) JAB
× (22.6.64) Bellingham (Northumberland) 155m. E.

74060 f.g. 4.10.64 Spurn Point
/?/ (18.12.64) Lora del Rio: 37°39′N. 5°32′W. (Sevilla) **Spain**

67410 pull. 27.6.64 Tetney Lock: 53°29′N. 0°01′W. (Lincoln) CRG
× (9.11.64) Préchac: 43°35′N. 0°00′ (Gers) **France**

74X f.g. 15.10.59 Cley
+ 0.1.64 Baena: 37°37′N. 4°20′W. (Córdoba) **Spain**

15573 f.g. 4.10.64 Holme: 52°58′N. 0°33′E. (Norfolk) HBO
+ 20.11.64 Palma del Rio: 37°43′N. 5°17′W. (Córdoba) **Spain**

08S f.g. 4.11.61 Gloucester: 51°52′N. 2°14′W. AC
× (2.4.64) Letheringsett, Holt (Norfolk) 155m. ENE.

54505 pull. 30.5.64 Hoddesdon: 51°47′N. 0°00′ (Hertford) RMRG
+ 20.10.64 Palma de Mallorca: 39°35′N. 2°39′E. **Balearic Islands**

89R f.g. 29.12.62 Cholsey: 51°34′N. 1°09′W. (Berkshire) OOS
× *c.* 13.1.64 Villers Bocage: 49°05′N. 0°39′W. (Calvados) **France**

66159 f.g. 29.11.64 Cliffe: 51°28′N. 0°30′E. (Kent) B&I
+ 20.12.64 St. Vincent-de-Paul: 43°45′N. 1°00′W. (Landes) **France**

30993 pull. 17.4.64 Haslemere: 51°06′N. 0°42′W. (Surrey) PGD
+ 24.10.64 Villarreal: 39°56′N. 0°08′W. (Castellón) **Spain**

99928 f.g. 26.2.58 Dungeness
× 2.5.64 Nymphsfield, Nailsworth (Gloucester) 145m. WNW.

57629 juv. 7.6.64 Beachy Head: 50°44′N. 0°15′E. (Sussex) BHRS
+ 26.9.64 Hiersac: 45°40′N. 0°00′ (Charente) **France**

34R f.g. 7.1.63 Portland Bill
+ 27.12.64 Santander: 43°28′N. 3°48′W. **Spain**

24R f.g. 3.11.62 Slapton: 50°17′N. 3°39′W. (Devon) SlBO
× (7.7.64) *near* Horncastle (Lincoln) 250m. NE.

Redwing (*Turdus iliacus*) (27; 30 miles; $5\frac{2}{12}$ years)

11450 1stW. 18.10.62 Fair Isle
× 23.4.64 Tong, Lewis (Ross) 185m. WSW.

6344 f.g. 10.10.63 Fair Isle
+ 13.2.64 St. Vivien: 45°26′N. 1°02′W. (Gironde) **France**

3837 f.g. 17.10.64 Fair Isle
× 21.12.64 Trunch, North Walsham (Norfolk) 480m. SSE.

5211 f.g. 12.10.63 Ossett: 53°41′N. 1°35′W. (York) AF
+ 25.10.64 Piani di Creto: 44°33′N. 8°59′E. (Genova) **Italy**

1134 f.g. 22.12.63 Sandon: 52°53′N. 2°05′W. (Stafford) C&PM
/?/ (24.12.64) Marmolejo: 38°03′N. 4°10′W. (Jaén) **Spain**

727 f.g. 29.11.58 Bradwell
+ 0.2.64 Villa Urbana: 39°53′N. 8°46′E. (Cagliari) **Sardinia**

CK15652	f.g.	18.10.64	Skokholm
	+	(2.12.64)	Tilly-sur-Seulles: 49°10'N. 0°37'W. (Calvados) **France**
83584X	f.g.	15.12.60	Cliffe: 51°28'N. 0°30'E. (Kent) M&B
	×	0.7.64	Tuuri: 62°36'N. 23°44'E. (Vaasa) **Finland**

There is no previous recovery of a British-ringed Redwing in Sardinia.

Ring Ouzel (*Turdus torquatus*) (2; 5 miles; $1\frac{6}{12}$ years)

07860X	1stW. ♂	21.9.62	Bardsey
	+	28.3.64	Coarraze: 43°10'N. 0°12'W. (Basses-Pyrénées) **France**

Blackbird (*Turdus merula*) (1,244; $9\frac{11}{12}$ years)

One hundred and six foreign recoveries will be tabulated in a future report. Published in full below are a surprising record from Italy, all recoveries from southern France and north-eastern Europe, and two interesting examples of multiple recovery.

CB00614	1stW. ♂	9.3.64	Clumber: 53°16'N. 1°04'W. (Nottingham) PG
	+	29.9.64	Branzi: 46°00'N. 9°46'E. (Bergamo) **Italy**
60775R	1stW. ♂	3.11.63	Low Hauxley: 55°19'N. 1°33'W. (Northumberland) NRG
	×	15.5.64	Jurvansalo: 63°03'N. 25°50'E. (Keski-Suomi) **Finland**
60929R	1stW. ♂	19.1.64	Gosforth: 55°02'N. 1°37'W. (Northumberland) NRG
	×	19.6.64	Taipale: 62°08'N. 26°54'E. (Mikkeli) **Finland**
CA07474	ad. ♀	3.3.63	Barrow: 54°07'N. 3°14'W. (Lancashire) WHT
	×	9.11.64	Hyyninen: 60°52'N. 21°27'E. (Turku-ja-Pori) **Finland**
CX01969	1stW. ♂	9.12.62	Burton: 53°16'N. 3°02'W. (Cheshire) MRG
	×	24.4.64	Piirsalu: 59°03'N. 24°03'E. (Haapsalu) **Estonian S.S.R.**
69375R	ad. ♂	8.12.63	Brancaster: 52°58'N. 0°38'E. (Norfolk) TFR
	×	16.4.64	Valmiera: 57°32'N. 25°29'E. **Latvian S.S.R.**
60755R	ad. ♀	2.11.63	Low Hauxley NRG
	×	13.2.64	Ondres: 43°34'N. 1°26'W. (Landes) **France**
CA67160	ad. ♂	22.2.64	Weelsby: 53°35'N. 0°05'W. (Lincoln) CRG
	+	13.11.64	Cachac: 44°55'N. 0°37'W. (Gironde) **France**
CX23092	1stW. ♂	26.10.63	Dungeness
	+	23.2.64	Sore: 44°20'N. 0°35'W. (Landes) **France**
90060X	f.g. ♂	27.11.61	Kinloch: 57°01'N. 6°20'W., Rhum (Inverness) PW
	v	21.3.64	Westerland: 54°54'N. 8°18'E., Sylt, North Frisian Is., **Germany**
	v	28.12.64	Kinloch
	v	10.3.65	Kinloch
	×	10.4.65	Visby: 55°01'N. 8°48'E. (Jylland) **Denmark**
95978S	1stW. ♂	14.10.62	Holywell: 55°04'N. 1°27'W. (Northumberland) AB
	v	23.1.63	Ashfield: 54°24'N. 6°10'W. (Down) 190m. W.
	+	22.10.64	Rekeland: 58°22'N. 6°16'E. (Rogaland) **Norway**

Wheatear (*Oenanthe oenanthe*) (13; 50 miles; 4 years)

618549	ad. ♀	12.9.60	Fair Isle
	()	20.9.64	El Kelaa: 32°05'N. 7°15'W. (Ouarzazate) **Morocco**
BA39190	juv.	27.7.63	Fair Isle
	×	0.5.64	Littlewood, Alford (Aberdeen) 165m. S.
BA52032	juv.	14.7.64	Fair Isle
	+	2.10.64	Barcarena: 38°44'N. 9°17'W. (Estremadura) **Portugal**

Map 5. All foreign recoveries so far reported of Redstarts *Phoenicurus phoenicurus*; recoveries mentioned in this report are marked by open circles and previous ones by solid dots (*drawn by R. C. Faulkner*)

AE32555	juv.	24.7.62	Eigg: 56°50′N. 6°10′W. (Inverness) GFO
	/?/	24.11.64	Valverde: 38°40′N. 6°58′W. (Badajóz) **Spain**
AN81345	1stW.	12.8.64	Mingulay: 56°48′N. 7°37′W. (Inverness) PJM
	×	7.9.64	Vitoria: 42°51′N. 2°40′W. (Alava) **Spain**
BA08796	juv.	31.7.64	Skokholm
	()	15.9.64	Fuenterrabia: 43°21′N. 1°48′W. (Guipúzcoa) **Spain**

Stonechat (*Saxicola torquata*) (4; 10 miles; $\frac{9}{12}$ year)

N47956	1stW. ♂	6.4.64	Dungeness
	×	19.6.64	Zichem: 51°00′N. 4°59′E. (Brabant) **Belgium**

Redstart (*Phoenicurus phoenicurus*) (14; 5 miles; $1\frac{11}{12}$ years)

AK17131	f.g. ♀	21.5.63	Isle of May
	+	(2.11.64)	Ablitas: 41°38′N. 1°39′W. (Navarra) **Spain**
AE52498	pull.	12.6.64	Kielder: 55°15′N. 2°35′W. (Northumberland) NRG
	v	13.9.64	Lihou: 49°28′N. 2°40′W. (Guernsey) **Channel Isles**
AK82451	pull.	19.6.63	*near* Sedbergh: 54°19′N. 2°32′W. (York) SS
	×	*c.* 1.5.64	Beja: 38°01′N. 7°52′W. (Baixo-Alentejo) **Portugal**
AH80514	ad. ♀	10.6.64	Spurn Point
	×	24.9.64	Estella: 42°41′N. 2°02′W. (Navarra) **Spain**
AH76231	1stW.	24.9.64	Spurn Point
	+	0.11.64	Alcaudete: 37°35′N. 4°05′W. (Jaén) **Spain**
AN67714	juv.	12.7.64	Fernilee: 53°18′N. 1°59′W. (Derby) S&B
	+	17.10.64	Baena: 37°37′N. 4°20′W. (Córdoba) **Spain**
AC40953	f.g. ♀	24.4.63	Great Saltee
	()	*c.* 5.4.64	Boumalne: 31°20′N. 6°00′W. (Ouarzazate) **Morocco**
N72708	ad. ♀	22.7.64	Ashridge: 51°48′N. 0°34′W., Tring (Hertford) JNTW
	×	13.10.64	Castelo Branco: 39°49′N. 7°30′W. (Beira-Baixa) **Portugal**
AE71701	1stW. ♀	25.9.62	Sandwich Bay
	v	3.9.64	Amrum: 54°38′N. 8°21′E. North Frisian Is., **Germany**
N46814	1stW. ♂	15.9.63	Chichester: 50°50′N. 0°48′W. (Sussex) CHI
	×	22.4.64	Talence: 44°49′N. 0°35′W. (Gironde) **France**
AN59118	1stW. ♂	7.9.64	Beachy Head: 50°44′N. 0°16′E. (Sussex) BHRS
	+	27.10.64	Orgiva: 36°54′N. 3°25′W. (Granada) **Spain**

Black Redstart (*Phoenicurus ochruros*) (2; 5 miles; $\frac{3}{12}$ year)

N47899	1stW. ♂	20.3.64	Dungeness
	×	0.7.64	Raismes: 50°23′N. 3°29′E. (Nord) **France**

Robin (*Erithacus rubecula*) (240; 100 miles; $5\frac{3}{12}$ years)

AN47031	juv.	21.6.64	Barrow: 54°07′N. 3°14′W. (Lancashire) KBB
	×	(16.9.64)	Plympton (Devon) 260m. S.
AC38725	f.g.	17.4.62	Spurn Point
	()	21.1.64	Wachtebeke: 51°10′N. 3°52′E. (East Flanders) **Belgium**
AE84343	f.g.	24.4.63	Spurn Point
	×	27.8.64	Christchurch (Hampshire) 210m. SSW.
AR36410	f.g.	5.10.64	Spurn Point
	×	(19.12.64)	Bourret: 43°57′N. 1°19′E. (Tarn-et-Garonne) **France**

50540	f.g.	8.10.64	Spurn Point
	v	11.10.64	Noordwijk-Binnen: 52°14′N. 4°26′E. (Zuid-Holland) **Netherlands**
55835	f.g.	4.10.64	Donna Nook: 53°28′N. 0°09′E. (Lincoln) CRG
	×	19.10.64	Pontivy: 48°04′N. 2°58′W. (Morbihan) **France**
06144	ad.	18.4.62	Scolt Head: 52°59′N. 0°44′E. (Norfolk) RC
	×	10.1.64	Auderghem: 50°48′N. 4°26′E. (Bruxelles) **Belgium**
33336	f.g.	16.9.63	Bardsey
	×	25.4.64	Meikleour (Perth) 270m. N.
55468	f.g.	15.12.63	Orford: 52°06′N. 1°33′E. (Suffolk) PAB
	×	17.4.64	Södra Torp: 60°19′N. 13°21′E. (Värmland) **Sweden**
74131	f.g.	20.9.64	Holland-on-Sea: 51°49′N. 1°13′E. (Essex) DW
	v	25.12.64	Wanze: 50°32′N. 5°13′E. (Liège) **Belgium**
82579	f.g.	23.8.64	Beachy Head: 50°44′N. 0°16′E. (Sussex) BHRS
	×	8.9.64	Cersay: 47°03′N. 0°20′W. (Deux-Sèvres) **France**
90608	f.g.	25.2.63	Selsey: 50°43′N. 0°47′W. (Sussex) ABW
	()	15.3.64	Gainford, Darlington (Durham) 270m. N.

Grasshopper Warbler (*Locustella naevia*) (2; 5 miles; $1\frac{3}{12}$ years)

69028	pull.	7.6.63	Leigh Woods: 51°28′N. 2°38′W. (Somerset) PJC
	×	4.9.64	Pointe de la Coubre: 45°42′N. 1°15′W. (Charente-Maritime) **France**

is is only the second foreign recovery of a British-ringed Grasshopper Warbler.

Reed Warbler (*Acrocephalus scirpaceus*) (43; 100 miles; 5 years)

25293	juv.	3.9.64	Fairburn: 53°45′N. 1°18′W. (York) CW
	/?/	3.10.64	St. Genès: 45°10′N. 0°40′W. (Gironde) **France**
40614	ad.	1.8.64	Fishtoft: 52°58′N. 0°01′E. (Lincoln) JRM
	v	28.8.64	Chichester (Sussex) 150m. SSW.
425	f.g.	1.10.62	Benacre: 52°21′N. 1°43′E. (Suffolk) AGH
	×	0.7.64	Châtellerault: 46°49′N. 0°33′E. (Vienne) **France**
91674	juv.	1.8.64	Walberswick: 52°18′N. 1°41′E. (Suffolk) DBC
	()	11.9.64	Vila do Conde: 41°21′N. 8°45′W. (Douro-Litoral) **Portugal**
91708	juv.	4.8.64	Walberswick DBC
	()	c. 10.10.64	Faro: 37°01′N. 7°56′W. (Algarve) **Portugal**
63373	juv.	18.8.63	Hoddesdon: 51°47′N. 0°00′ (Hertford) RMRG
	×	22.9.64	Rabat: 34°02′N. 6°51′W. **Morocco**
9496	juv.	15.8.64	West Wycombe: 51°39′N. 0°48′W. (Buckingham) SBRG
	()	29.9.64	Tunes Gare: 37°10′N. 8°15′W. (Algarve) **Portugal**
9500	juv.	15.8.64	West Wycombe. SBRG
	v	25.9.64	Inezgane: 30°37′N. 9°38′W. (Agadir) **Morocco**
55498	pull.	24.7.64	Dorchester: 51°39′N. 1°10′W. (Oxford) OOS
	/?/	5.10.64	Martingança: 39°41′N. 8°58′W. (Estremadura) **Portugal**
55376	pull.	19.7.64	South Hornchurch: 51°33′N. 0°13′E. (Essex) CEJC
	×	9.9.64	Cazaux: 44°32′N. 1°08′W. (Gironde) **France**
37929	ad.	12.8.64	South Hornchurch MPT
	×	(3.9.64)	Samel: 40°27′N. 8°34′W. (Beira-Litoral) **Portugal**
917	juv.	13.8.64	Burham: 51°20′N. 0°29′E. (Kent) MKRG
	×	c. 1.11.64	Almocageme: 38°47′N. 9°28′W. (Estremadura) **Portugal**

N70851	ad.	13.7.64	Snodland: 51°20′N. 0°26′E. (Kent) MKRG
	+	2.9.64	Albufeira: 37°05′N. 8°15′W. (Algarve) **Portugal**
AA09273	juv.	31.7.60	Sandwich Bay
	×	(14.4.64)	Cadaval: 39°15′N. 9°06′W. (Estremadura) **Portugal**
AH36602	juv.	9.8.63	Sandwich Bay
	+	28.9.64	Ataboeira: 37°05′N. 8°16′W. (Algarve) **Portugal**
AR17490	juv.	14.9.64	Sandwich Bay
	+	*c.* 10.10.64	Lagos: 37°05′N. 8°40′W. (Algarve) **Portugal**
P36060	pull.	14.7.64	Frensham: 51°10′N. 0°48′W. (Surrey) PGD
	+	*c.* 26.9.64	Gondomar: 41°10′N. 8°35′W. (Douro-Litoral) **Portugal**
AH28468	juv.	16.8.63	Stanpit: 50°44′N. 1°44′W. (Hampshire) CHRS
	()	28.9.64	Alcochete: 38°45′N. 8°57′W. (Estremadura) **Portugal**
AN71832	juv.	30.7.64	Slapton: 50°17′N. 3°39′W. (Devon) SlBO
	×	(24.9.64)	Vila Nova de Gaia: 41°08′N. 8°37′W. (Douro-Litoral) **Portugal**

Sedge Warbler (*Acrocephalus schoenobaenus*) (23; 75 miles; 1 11/12 years)

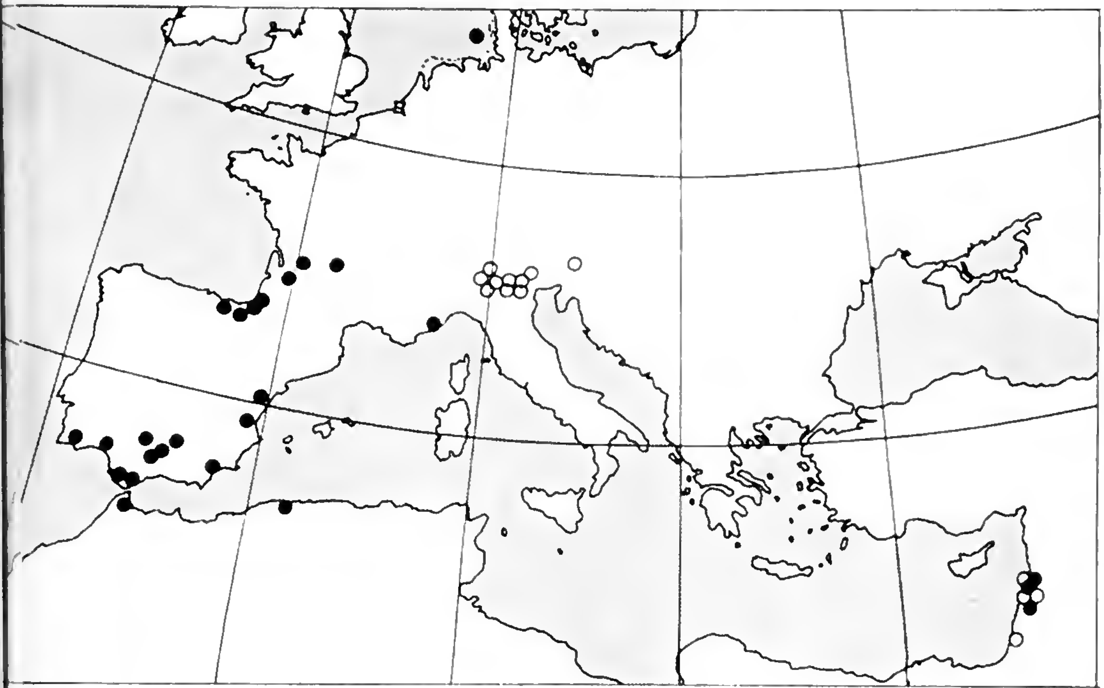
AN95101	juv.	1.8.64	Adwick-le-Street: 53°34′N. 1°11′W. (York) ARS
	×	*end* 8.64	Bourseul: 48°31′N. 2°16′W. (Côtes-du-Nord) **France**
AN61384	juv.	23.7.64	Shotton: 53°12′N. 3°02′W. (Flint) MRG
	×	27.8.64	Frampton Cotterell (Gloucester) 120m. S.
N97452	juv.	21.7.64	Bardsey
	×	*c.* 4.8.64	Goldcliff, Newport (Monmouth) 110m. SE.
SE05375	juv.	5.9.64	West Wycombe: 51°39′N. 0°48′W. (Buckingham) SBRG
	v	10.9.64	Sandwich Bay (Kent) 95m. ESE.
AN78223	juv.	15.8.64	Chew Valley Reservoir: 51°20′N. 2°38′W. (Somerset) CVRS
	×	21.8.64	Nantes: 47°14′N. 1°35′W. (Loire-Atlantique) **France**
N90350	f.g.	3.5.64	Dungeness
	×	12.7.64	Abbeylara, Granard (Longford) 405m. WNW.
N46088	juv.	6.8.63	Chichester: 50°50′N. 0°48′W. (Sussex) CHI
	v	26.4.64	Bradwell-on-Sea (Essex) 95m. NE.
N46181	ad.	15.8.63	Chichester CHI
	v	16.7.64	Gosforth (Northumberland) 290m. N.
P41601	juv.	12.8.64	Chichester CHI
	v	16.8.64	Chew Valley Reservoir (Somerset) 85m. WNW.
AK21833	juv.	7.9.63	Eastbourne: 50°46′N. 0°17′E. (Sussex) DDH
	×	8.5.64	Mondeville: 49°10′N. 0°18′W. (Calvados) **France**
AH28293	juv.	28.7.63	Wick Hams: 50°44′N. 1°45′W. (Hampshire) CHRS
	v	22.4.64	Abberton (Essex) 135m. NE.
		12.5.64	Abberton
AB56271	ad.	19.4.64	St. Catherine's Point: 50°34′N. 1°18′W. Isle of Wight AKS
	v	24.4.64	Attenborough (Nottingham) 155m. N.
		15.6.64	Attenborough
AN72206	ad.	21.8.64	Slapton: 50°17′N. 3°39′W. (Devon) SlBO
	v	23.8.64	Chichester (Sussex) 130m. E.

Ringers have been paying special attention to Sedge and Reed Warblers. The resulting increase in recoveries is most encouraging.

Icterine Warbler (*Hippolais icterina*) (1; 1 day)

AK91738	f.g.	2.9.64	St. Agnes
	()	3.9.64	St. George's Channel: 50°15′N. 8°10′W. *c.* 85m. WNW.

This is the first recovery of a British-ringed Icterine Warbler.



6. All foreign recoveries so far reported of Blackcaps *Sylvia atricapilla* (solid dots) and
...er Whitethroats *Sylvia curruca* (open circles). The lines of longitude and latitude are at 10°
intervals (*drawn by C. J. Mead*)

Blackcap (*Sylvia atricapilla*) (12; 50 miles; $5\frac{1}{12}$ years)

3344	f.g. ♂ ()	25.4.64 15.10.64	Adwick-le-Street: 53°34′N. 1°11′W. (York) ARS Casinos: 39°42′N. 0°43′W. (Valencia) **Spain**
4979	juv. +	14.9.63 22.10.63	Sprotborough: 53°32′N. 1°11′W. (York) WGD Colle di S. Bernardo: 43°54′N. 7°53′E. (Imperia) **Italy**
8262	ad. ♂ v	25.5.63 13.5.64	Deeping St. Nicholas: 52°43′N. 0°12′W. (Lincoln) TFR Heligoland: 54°11′N. 7°55′E. **Germany**
223	ad. ♂ v	9.9.63 17.6.64	Lane End: 51°37′N. 0°48′W. (Buckingham) DNM Middlewich (Cheshire) 125m. NW.
3267	ad. ♀ ()	4.8.64 5.10.64	Swindon: 51°34′N. 1°47′W. (Wiltshire) GLW La Réole: 44°35′N. 0°02′W. (Gironde) **France**
760	f.g. ♀ ×	10.9.63 25.4.64	Burgess Hill: 50°57′N. 0°08′W. (Sussex) JAW Brandon (Suffolk) 105m. N.
9925	1stW. ♂ ×	11.9.63 12.4.64	Beachy Head: 50°44′N. 0°16′E. (Sussex) BHRS Clergoux: 45°16′N. 1°58′E. (Corrèze) **France**
8951	f.g. +	25.9.64 (14.10.64)	Beachy Head BHRS Galdácano: 43°14′N. 2°50′W. (Vizcaya) **Spain**

4979 is the first British-ringed Blackcap to be recovered in Italy, but there are ... previous spring recoveries in Lebanon. It is believed that the Blackcaps ...ing this south-easterly orientation belong to the Scandinavian population. ...four concerned were all ringed between 10th and 18th September, but, of ...se, in different years.

Garden Warbler (*Sylvia borin*) (4; 20 miles; $\frac{1}{12}$ year)

N93253	juv.	16.8.64	Elm Park: 51°33′N. 0°12′E. (Essex) RRS
	+	6.9.64	Algeciras: 36°08′N. 5°27′W. (Cádiz) **Spain**
AN30634	f.g.	5.8.64	East Boldre: 50°47′N. 1°33′W. (Hampshire) NDP
	v	16.8.64	Portland Bill (Dorset) 45m. SW.

Whitethroat (*Sylvia communis*) (28; 100 miles; $2\frac{11}{12}$ years)

AK17481	f.g.	16.9.63	Isle of May
	()	*c.* 6.4.64	Tinerhir: 31°28′N. 5°30′W. (Ouarzazate) **Morocco**
AH91708	ad. ♂	22.5.64	Isle of May
	()	3.10.64	Estói: 37°05′N. 7°54′W. (Algarve) **Portugal**
AN41554	pull.	27.6.64	Cramlington: 55°05′N. 1°37′W. (Northumberland) TTRG
	+	19.9.64	Monforte de Lemos: 42°32′N. 7°30′W. (Lugo) **Spain**
AR04344	f.g.	20.8.64	Walney: 54°05′N. 3°15′W. (Lancashire) WBO
	()	18.9.64	Lagos: 37°05′N. 8°40′W. (Algarve) **Portugal**
AN81496	juv.	2.9.64	Walney WHT
	×	(5.10.64)	Setúbal: 38°31′N. 8°54′W. (Estremadura) **Portugal**
AE93596	ad. ♂	24.9.62	Gibraltar Point
	×	27.9.64	Agueda: 40°34′N. 8°27′W. (Beira-Litoral) **Portugal**
AN99004	juv.	8.8.64	Fishtoft: 52°58′N. 0°01′E. (Lincoln) JRM
	×	(24.8.64)	Cocumont: 44°27′N. 0°03′E. (Lot-et-Garonne) **France**
AN44704	ad. ♀	4.8.64	Brandon: 52°24′N. 1°24′W. (Warwick) AWE
	+	3.10.64	Bragança: 41°47′N. 6°46′W. (Tras-os-Montes) **Portugal**
SC98508	1stW.	3.8.64	Frampton-on-Severn: 51°46′N. 2°22′W. (Gloucester) AC
	+	(8.8.64)	Albourne, Hassocks (Sussex) 110m. ESE.
P32876	ad. ♀	3.8.64	Stockbury: 51°20′N. 0°41′E. (Kent) MKRG
	()	10.9.64	Estômbar: 37°09′N. 8°29′W. (Algarve) **Portugal**
N98112	ad. ♂	3.5.64	Portland Bill
	×	16.6.64	Whittington, Lichfield (Stafford) 150m. N.

Lesser Whitethroat (*Sylvia curruca*) (5; 15 miles; $\frac{11}{12}$ year)

AN39509	f.g.	4.8.64	Castor Hanglands: 52°34′N. 0°21′W. (Northampton) C&F
	+	10.9.64	Laghetto di Vicenza: 45°34′N. 11°33′E. **Italy**
P31777	f.g.	15.8.64	Cliffe: 51°28′N. 0°30′E. (Kent) NKRG
	()	20.9.64	Schio: 45°43′N. 11°21′E. (Vicenza) **Italy**
AN54547	f.g.	16.8.64	Sandwich Bay
	+	30.8.64	Vicenza: 45°33′N. 11°33′E. **Italy**

Willow Warbler (*Phylloscopus trochilus*) (26; 10 miles; 4 years)

AK85510	juv.	14.8.63	Isle of May
	+	17.4.64	Le Khroub: 36°15′N. 6°40′E. (Constantine) **Algeria**
AE84727	f.g.	4.9.63	Spurn Point
	×	23.5.64	Bridge of Gaur, Rannoch (Perth) 280m. NW.
AK93566	pull.	15.6.63	Fernilee: 53°18′N. 1°59′W. (Derby) S&B
	+	0.4.64	Troumgoumbé: *c.* 15°15′N. 8°50′W. **Mali**
N97101	f.g.	17.4.64	Bardsey
	v	19.4.64	Skokholm (Pembroke) 75m. SSW.
		21.4.64	Skokholm

·398	juv.	14.8.64	Bardsey
	/?/	11.9.64	Quiroga: 42°28′N. 7°15′W. (Lugo) **Spain**
009	juv.	30.8.63	Skokholm
	×	(15.5.64)	Wheathampstead (Hertford) 210m. E.
5408	f.g.	16.8.64	Stock: 51°41′N. 0°26′E. (Essex) AGH
	×	8.9.64	Fontibre: 42°58′N. 4°02′W. (Santander) **Spain**
78205	juv.	15.8.64	Chew Valley Reservoir: 51°20′N. 2°38′W. (Somerset) CVRS
	+	30.9.64	Nieul: 46°12′N. 1°10′W. (Charente-Maritime) **France**
1463	f.g.	5.5.60	Dungeness
	×	(26.5.64)	Bamford, Hathersage (Derby) 200m. NW.

recovery in Mali is the most southerly one so far recorded for a British-ringed llow Warbler and there is only one previous return from Algeria.

Chiffchaff (*Phylloscopus collybita*) (11; 25 miles; 1 7/12 years)

394	juv.	19.9.63	Bardsey
	v	14.5.64	Great Saltee (Wexford) 90m. WSW.
5320	juv.	31.5.64	Frampton-on-Severn: 51°46′N. 2°22′W. (Gloucester) KJG
	/?/	4.10.64	Macão: 39°33′N. 8°00′W. (Beira-Baixa) **Portugal**
263	f.g.	6.4.64	Skokholm
	v	30.10.64	Sidi Slimane: 34°20′N. 6°00′W. (Kenitra) **Morocco**
9183	f.g.	12.9.64	Littleton: 51°36′N. 2°35′W. (Gloucester) PJC
	()	(24.11.64)	Santa Maria: 43°21′N. 3°01′W. (Vizcaya) **Spain**
53303	ad.	7.8.64	Swindon: 51°34′N. 1°47′W. (Wiltshire) GLW
	/?/	16.10.64	Ceánuri: 43°06′N. 2°45′W. (Vizcaya) **Spain**
77403	f.g.	3.10.63	Sandwich Bay
	+	11.10.64	Alza: 43°18′N. 1°55′W. (Guipúzcoa) **Spain**
981	ad.	26.8.62	Fernhurst: 51°03′N. 0°43′W. (Sussex) PGD
	×	30.3.64	Kilnsea (York) 185m. N.

Wood Warbler (*Phylloscopus sibilatrix*) (1; 2 1/12 years)

11570	pull.	5.7.62	Dore: 53°20′N. 1°33′W. (Derby) SNHS
	+	30.8.64	Mosorrofa: 38°05′N. 15°43′E. (Reggio di Calabria) **Italy**

Goldcrest (*Regulus regulus*) (3; 5 miles; 1/12 year)

3158	f.g. ♂	3.10.64	Grune Point: 54°54′N. 3°21′W. (Cumberland) RS
	×	(11.11.64)	Whitehaven (Cumberland) 26m. SSW.

Spotted Flycatcher (*Muscicapa striata*) (14; 20 miles; 4 3/12 years)

040	ad.	20.5.64	Calf of Man
	v	15.8.64	Hilbre Island (Cheshire) 78m. ESE.
0529	ad.	5.7.64	Friskney: 53°04′N. 0°11′E. (Lincoln) JRM
	+	c. 5.10.64	Mogadouro: 41°20′N. 6°43′W. (Tras-os-Montes) **Portugal**
50	ad.	22.6.62	Cholsey: 51°34′N. 1°09′W. (Berkshire) OOS
	×	(6.1.64)	Córdoba: 37 53′N. 4°46′W. **Spain**
6953	f.g.	4.10.64	Sandwich Bay
	()	(8.11.64)	*near* Bougie: 36°49′N. 5°03′E. **Algeria**
839	pull.	15.6.64	Haslemere: 51°06′N. 0°43′W. (Surrey) PGD
	+	13.9.64	Azambuja: 39°04′N. 8°52′W. (Ribatejo) **Portugal**

AK21798	juv.	23.8.63	Eastbourne: 50°46′N. 0°17′E. (Sussex) DDH
	×	(12.6.64)	Ahoghill, Ballymena (Antrim) 390m. NW.
AA25726	pull.	14.6.60	Christchurch: 50°44′N. 1°45′W. (Hampshire) DJG
	×	27.9.64	Torrelodones: 40°35′N. 3°56′W. (Madrid) **Spain**
AK51612	f.g.	14.8.64	Eddystone Lighthouse: 50°10′N. 4°16′W. (Devon) HST
	()	0.9.64	*near* Zaragoza: 41°39′N. 0°52′W. **Spain**

AR96953 is the first British-ringed Spotted Flycatcher to be recovered in Algeria.

Pied Flycatcher (*Muscicapa hypoleuca*) (9; 5 miles; $2\frac{10}{12}$ years)

N77511	juv.	17.8.64	Seahouses: 55°35′N. 1°39′W. (Northumberland) PRE
	()	*c.* 25.10.64	Bragança: 41°47′N. 6°46′W. (Tras-os-Montes) **Portugal**
AB83789	pull.	19.6.64	Hamsterley: 54°41′N. 1°49′W. (Durham) ND&N
	×	30.8.64	Cabo Espichel: 38°24′N. 9°13′W. (Estremadura) **Portugal**
AE84650	f.g.	2.9.63	Spurn Point
	×	17.9.64	Cacela: 37°10′N. 7°33′W. (Algarve) **Portugal**
H53004	ad. ♂	29.5.61	Parkend: 51°46′N. 2°33′W. (Gloucester) BC
	v	22.6.62	Parkend
	v	16.6.63	Parkend
	/?/	31.3.64	Stellanello: 44°00′N. 8°03′E. (Savona) **Italy**

H53004 is the first British-ringed Pied Flycatcher to be recovered in Italy.

Dunnock (*Prunella modularis*) (153; 20 miles; $5\frac{7}{12}$ years)

AH56913	ad.	4.7.64	West Burton: 54°17′N. 1°59′W. (York) AAB
	×	26.11.64	*near* Boroughbridge (York) *c.* 27m. SE.
AK90797	ad.	5.4.64	Portland Bill
	×	27.11.64	Pauillac: 45°12′N. 0°45′W. (Gironde) **France**

The latter recovery is of interest, not merely because it is from much further south than any previous report of this species, but also because it provides evidence of a Dunnock of presumed Continental origin occurring in the west country. All previous foreign recoveries have been of birds ringed on the east coast.

Meadow Pipit (*Anthus pratensis*) (31; $4\frac{11}{12}$ years)

P48287	f.g.	7.9.64	Gibraltar Point
	+	21.10.64	Narni: 42°31′N. 12°31′E. (Terni) **Italy**
AS31119	juv.	18.9.64	Abberton
	×	24.10.64	Marignanne: 43°25′N. 5°12′E. (Bouches-du-Rhône) **France**
AK04595	f.g.	23.9.62	Elm Park: 51°33′N. 0°12′E. (Essex) RRS
	×	5.4.64	Barnacre, Garstang (Lancashire) 200m. NW.

Recoveries showing marked south-easterly orientation are exceptional, as are long distance movements within the British Isles. A further 18 foreign recoveries, in France (five), Spain (six) and Portugal (seven) will be tabulated in a future report.

Pied/White Wagtail (*Motacilla alba*) (59; 100 miles; $3\frac{10}{12}$ years)

H60375	1stS. ♂	24.3.62	Bamburgh: 55°36′N. 1°42′W. (Northumberland) MHBO
	×	0.2.63	Ancenis: 47°23′N. 1°10′W. (Loire-Atlantique) **France**
AE15895	juv.	28.8.64	Carnforth: 54°08′N. 2°46′W. (Lancashire) MBRG
	+	15.11.64	El Arahal: 37°15′N. 5°33′W. (Sevilla) **Spain**
SC64568	ad. ♀	7.7.63	Ilkley: 53°56′N. 1°49′W. (York) WNS
	×	*c.* 18.4.64	Darque: 41°40′N. 8°47′W. (Minho) **Portugal**

18174	juv.	31.7.63	Fairburn: 53°45′N. 1°18′W. (York) CW
	/?/	5.1.64	Barra Cheia: 38°35′N. 9°00′W. (Estremadura) **Portugal**
65429	1stW.	7.8.64	Tetney Lock: 53°29′N. 0°01′W. (Lincoln) CRG
	()	13.12.64	Alcácer: 38°22′N. 8°30′W. (Baixo-Alentejo) **Portugal**
55701	1stW.	25.8.64	Tetney Lock CRG
	×	(12.11.64)	Brighton (Sussex) 185m. S.
51846	pull.	30.5.64	Fernilee: 53°18′N. 1°59′W. (Derby) S&B
	+	7.11.64	Sabugo: 38°49′N. 9°18′W. (Estremadura) **Portugal**
1867	juv.	19.7.64	Abberton
	+	24.12.64	Gafanha da Nazaré: 40°38′N. 8°43′W. (Beira-Litoral) **Portugal**
0526	juv.	23.8.64	Abberton
	+	(2.11.64)	Sintra: 38°48′N. 9°22′W. (Estremadura) **Portugal**
9828	1stW.	30.9.63	Oxford: 51°45′N. 1°16′W. CMR
	+	20.2.64	Coreses: 41°33′N. 5°37′W. (Zamora) **Spain**
4479	ad. ♀	12.10.64	Oxford GRMP
	()	14.11.64	Arbonne: 43°28′N. 1°32′W. (Basses-Pyrénées) **France**
4488	1stW. ♂	16.10.64	Wolvercote: 51°45′N. 1°16′W. (Oxford) GRMP
	+	1.11.64	Oyarzun: 43°17′N. 1°50′W. (Guipúcoa) **Spain**
672	ad. ♀	23.6.64	Cholsey: 51°34′N. 1°09′W. (Berkshire) OOS
	/?/	0.12.64	Salreu: 40°43′N. 8°34′W. (Beira-Litoral) **Portugal**
5720	juv.	11.7.64	Elm Park: 51°33′N. 0°12′E. (Essex) RRS
	+	12.11.64	Odeleite: 37°20′N. 7°29′W. (Algarve) **Portugal**
5835	juv.	15.8.64	Elm Park RRS
	×	(22.10.64)	Pacy-sur-Eure: 49°01′N. 1°24′E. (Eure) **France**
5705	f.g.	17.9.63	Northfleet: 51°27′N. 0°20′E. (Kent) B&I
	/?/	(7.11.64)	Grândola: 38°10′N. 8°34′W. (Baixo-Alentejo) **Portugal**
5559	pull.	11.6.64	Winchester: 51°04′N. 1°19′W. (Hampshire) WC
	()	(23.11.64)	Mexilhoeira: 37°10′N. 8°36′W. (Algarve) **Portugal**

Yellow Wagtail ssp. (*Motacilla flava*) (27; 50 miles; $2\frac{8}{12}$ years)

7670	juv.	23.7.64	Fairburn: 53°45′N. 1°18′W. (York) CW
	+	10.9.64	Burgos: 42°20′N. 3°40′W. **Spain**
3777	f.g.	25.9.64	Low Ellers: 53°30′N. 1°05′W. (York) RM
	× (car)	(14.12.64)	*between* Taiba and Dakar: *c.* 15°00′N. 17°00′W. **Sénégal**
4906	juv.	31.8.64	Elworth: 53°09′N. 2°23′W. (Cheshire) G&W
	/?/	1.10.64	Chipiona: 36°44′N. 6°26′W. (Cádiz) **Spain**
99	1stW.	15.9.63	Minsmere: 52°14′N. 1°37′E. (Suffolk) HEA
	×	8.5.64	Vrouwenpolder: 51°35′N. 3°37′E., Walcheren (Zeeland) **Netherlands**
29	ad. ♂	18.4.63	Abberton
	×	12.4.64	Tolosa: 43°08′N. 2°04′W. (Guipúzcoa) **Spain**
21	juv.	20.6.63	Abberton
	×	9.4.64	M'Semrir: 31°25′N. 6°00′W. (Haute Atlas) **Morocco**
48	juv.	3.7.63	Abberton
	×	0.4.64	*near* Colomb-Bechar: 31°35′N. 2°17′W. **Algeria**
065	juv.	6.8.64	Abberton
	/?/	(1.10.64)	Bustos: 40°30′N. 8°36′W. (Beira-Litoral) **Portugal**
42	juv.	12.8.63	Abberton
	×	0.10.64	Conceição: 37°08′N. 7°36′W. (Algarve) **Portugal**

AK45168	ad. ♂	18.4.63	Elm Park: 51°33′N. 0°12′E. (Essex) RRS
	+	7.10.64	Los Palacios y Villafranca: 37°10′N. 5°55′W. (Sevilla) **Spain**
AK45856	juv.	21.8.64	Elm Park RRS
	+	21.9.64	Figueira da Foz: 40°09′N. 8°51′W. (Beira-Litoral) **Portugal**
AK45905	juv.	7.9.64	Elm Park RRS
	+	*c.* 4.10.64	Oporto: 41°10′N. 8°37′W. (Douro-Litoral) **Portugal**
N56396	juv.	6.7.64	East Tilbury: 51°28′N. 0°26′E. (Essex) ABO
	v	28.8.64	Pagham (Sussex) 75m. SW.

Never before have so many foreign recoveries of Yellow Wagtails been reported in a single year, the previous highest being six in 1959. AR23777, N22221 and N22348 make noteworthy additions to our knowledge of the movements of this species in Africa.

Waxwing (*Bombycilla garrulus*) (3; 10 miles; $\frac{2}{12}$ year)

97739X	ad.	24.12.63	Golden Acre: 53°52′N. 1°36′W., Leeds (York) MD
	×	22.2.64	Great Ayton (York) 47m. NNE.

Starling (*Sturnus vulgaris*) (1,266; $9\frac{2}{12}$ years)

Table G—Countries and months of recoveries of Starlings

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Spain (1)	1	–	–	–	–	–	–	–	–	–	–	–
France (6)	1	1	–	–	–	–	–	–	–	–	–	4
Channel Is. (1)	–	–	–	–	–	–	–	–	–	–	1	–
Belgium (35)	1	–	–	–	1	1	2	–	1	18	10	1
Netherlands (17)	2	3	2	2	1	2	1	3	1	–	–	–
Germany (80*)	2	4	11	14	8	14	8	3	3	7	3	2
Denmark (21)	–	–	4	1	3	2	6	2	1	2	–	–
North Sea (2)	–	–	–	–	–	–	–	–	–	–	2	–
Norway (16)	–	–	2	2	3	7	2	–	–	–	–	–
Sweden (16*)	–	–	–	3	4	3	4	–	–	1	–	–
Poland (12)	–	–	–	7	2	–	2	1	–	–	–	–
Baltic States (12)	–	–	–	1	7	1	1	1	–	–	–	1
Finland (7)	–	–	–	1	2	1	1	2	–	–	–	–
U.S.S.R. (18*)	–	–	–	2	9	3	1	1	–	1	–	–

*Total includes undated records
See footnote to table A

Published in full are the first-ever recovery of a British-ringed Starling in Iberia the extreme easterly and northerly records; four multiple recoveries; and fou interesting movements by birds which were apparently of British stock:

718572	juv.	7.7.63	Elm Park: 51°33′N. 0°12′E. (Essex) RRS
	+	*c.* 24.1.64	Santander: 43°28′N. 3°48′W. **Spain**
76376R	1stW. ♂	5.1.63	Knaresborough: 54°01′N. 1°28′W. (York) KRS
	/?/	(27.8.64)	Salla: 66°50′N. 28°40′E. (Lappi) **Finland**
57698R	ad. ♂	17.1.63	Holland-on-Sea: 51°49′N. 1°13′E. (Essex) DW
	×	15.5.64	Kirillov: 59°51′N. 38°22′E. (Vologda) **U.S.S.R.**
737410	1stW. ♀	30.12.61	Knaresborough KRS
	v	1.5.63	Penijoe: 58°43′N. 24°49′E. (Haapsalu) **Estonian S.S.R.**
	×	22.4.64	Penijoe
S85453	f.g.	10.4.58	Bardsey
	v	12.4.59	Fristad: 57°49′N. 13°02′E. (Älvsborg) **Sweden**
	v	4.5.61	Fristad

;10S	f.g. ♂	18.3.62	Sandford: 51°42′N. 1°16′W. (Oxford) OOS
	v	9.2.63	Attenborough: 52°54′N. 1°14′W. (Nottingham) 80m. N.
	×	8.7.64	Boldekow: 53°44′N. 13°36′E. (Mecklenburg) **Germany**
:24R	1stW.	9.1.63	Ewhurst: 51°09′N. 0°26′W. (Surrey) L&JW
	v	12.1.64	Melsbroek: 50°55′N. 4°29′E. (Brabant) **Belgium**
	×	18.5.64	Melsbroek
:17086	juv.	6.6.63	Knaresborough KRS
	×	(10.3.64)	Waterford 260m. WSW.
:266	juv.	30.6.63	Elm Park RRS
	v	18.12.64	Athis: 48°48′N. 0°29′W. (Orne) **France**
:23700	juv.	14.6.64	Dungeness
	()	8.11.64	Middelkerke: 51°11′N. 2°49′E. (West Flanders) **Belgium**
:23933	juv. ♀	21.6.64	Dungeness
	+	0.12.64	Plélo: 48°34′N. 2°57′W. (Côtes-du-Nord) **France**

Greenfinch (*Chloris chloris*) (528; 100 miles; $5\frac{10}{12}$ years)

;48R	ad. ♂	18.2.63	Jurby: 54°21′N. 4°32′W. Isle of Man LK
	×	8.4.64	Llanwern (Brecon) 175m. SSE.
lI14768	juv. ♀	21.8.63	Capenhurst: 53°16′N. 2°57′W. (Cheshire) MRG
	×	11.4.64	Lambay Island (Dublin) 125m. W.
;538	ad. ♂	24.10.63	Bardsey
	v	14.2.64	Arklow (Wicklow) 56m. W.
:26S	ad. ♂	24.6.62	Hoddesdon: 51°47′N. 0°00′ (Hertford) RMRG
	()	29.12.64	Notre Dame d'Elle: 49°06′N. 1°02′W. (Manche) **France**
:23R	f.g. ♂	9.2.63	Brent Knoll: 51°16′N. 2°57′W. (Somerset) EGH
	×	(9.3.64)	Cockerham (Lancashire) 195m. N.
:23586	ad. ♂	4.1.63	Fordingbridge: 50°56′N. 1°48′W. (Hampshire) JSA
	×	(8.7.64)	Histon (Cambridge) 120m. NE.
:17716	ad. ♀	12.4.62	Dungeness
	v	25.1.64	Carentan: 49°18′N. 1°14′W. (Manche) **France**
:34120	1stW. ♀	28.10.62	Dungeness
	×	12.4.64	Rouen: 49°26′N. 1°05′E. (Seine-Maritime) **France**
;92S	ad. ♀	22.4.62	Sway: 50°47′N. 1°37′W. (Hampshire) EC
	v	30.12.62	Luton (Bedford) 90m. NE.
	v	30.1.64	Hendon (Middlesex) 21m. S.

…vements of ringed Greenfinches across the Irish Sea are exceptional and it is …eresting that three records should have been reported in the same year.

Goldfinch (*Carduelis carduelis*) (53; 100 miles; $3\frac{3}{12}$ years)

Table H—Countries and months of recoveries of Goldfinches

…try of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
…um (10)	–	–	–	–	–	–	–	–	–	6	4	–
…e (8)	–	–	–	1	–	–	–	–	–	1	4	2
… (9)	1	–	–	1	1	–	–	–	–	–	3	3

See footnote to table A

Siskin (*Carduelis spinus*) (3; 5 miles; $\frac{6}{12}$ year)

;60433	ad. ♀	31.3.63	Playford: 52°05′N. 1°14′E. (Suffolk) CGDC
	/?/	12.10.63	Oostkamp: 51°09′N. 3°14′E. (West Flanders) **Belgium**

SC76873	ad. ♂	1.11.64	Harefield: 51°36′N. 0°28′W. (Middlesex) FKB
	/?/	7.11.64	Zwevezele: 51°02′N. 3°13′E. (West Flanders) **Belgium**

Linnet (*Carduelis cannabina*) (160; 100 miles; $4\frac{9}{12}$ years)

Table I—Countries and months of recoveries of Linnets

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Netherlands (1)	–	–	–	1	–	–	–	–	–	–	–	–
Belgium (1)	–	–	–	–	–	–	–	–	–	1	–	–
Channel Is. (1)	–	–	1	–	–	–	–	–	–	–	–	–
France (79)	1	1	3	–	–	–	–	–	–	39	28	7
Spain (15)	2	1	–	–	–	–	–	–	–	5	5	2

See footnote to table A

AK90505	ad. ♂	9.10.63	Portland Bill
	v	11.8.64	Cheddington (Buckingham) 115m. NE.

Redpoll (*Carduelis flammea*) (38; 50 miles; $2\frac{3}{12}$ years)

Twenty-seven Redpolls were recovered in Belgium during the year, one in February, 16 in October and ten in November. Nearly all of them were taken by bird-catchers and it is clear that many British-bred finches end their days in Belgian aviaries. There were two other foreign recoveries in addition to the above. One was bought as a caged bird in north-west Germany in November and the other was caught and caged in northern France in December.

AK89641	f.g.	29.7.63	Gosforth: 55°02′N. 1°37′W. (Northumberland) TTRG
	v	27.9.64	Wintersett Reservoir (York) 90m. S.
AH61437	ad. ♀	29.3.64	Mere: 53°20′N. 2°25′W. (Cheshire) S&B
	×	3.7.64	Lennel, Coldstream (Berwick) 165m. N.
AE47456	1stW. ♂	10.12.62	Wytham: 51°47′N. 1°19′W. (Berkshire) EGI
	×	2.7.64	Floors Castle, Kelso (Roxburgh) 270m. N.

Bullfinch (*Pyrrhula pyrrhula*) (106; 30 miles; 5 years)

AK35787	1stW. ♀	12.1.64	Cleethorpes: 53°34′N. 0°02′W. (Lincoln) KR
	v	18.11.64	Peakirk (Northampton) 62m. S.
AK34621	1stW. ♂	22.12.63	Thameshaven: 51°31′N. 0°31′E. (Essex) VSW
	×	31.3.64	Westfield, Battle (Sussex) 40m. S.
AB68421	juv.	22.7.61	Woldingham: 51°17′N. 0°02′W. (Surrey) GRM
	× (=♀)	8.8.64	Histon (Cambridge) 66m. N.

Chaffinch (*Fringilla coelebs*) (131; 60 miles; $10\frac{7}{12}$ years)

Table J—Countries and months of recoveries of Chaffinches

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
France (1)	–	–	–	–	–	–	–	–	–	1	–	–
Belgium (15)	–	–	–	–	–	–	–	–	–	–	14	1
Netherlands (6)	1	–	1	1	1	–	–	–	–	1	1	–
Germany (1)	–	–	–	1	–	–	–	–	–	–	–	–
Denmark (1)	–	–	–	1	–	–	–	–	–	–	–	–
Norway (3)	–	–	–	3	–	–	–	–	–	–	–	–
Sweden (6)	–	–	1	1	2	–	1	1	–	–	–	–

See footnote to table A

...though there are grounds for believing that many British Chaffinches winter in ...lland, the following recovery is exceptional:

18753	ad. ♂	3.11.62	*near* Pateley Bridge: 54°08′N. 1°48′W. (York) SS&W
	×	(3.2.64)	Castlepollard (Westmeath) 225m. W.

Brambling (*Fringilla montifringilla*) (6; 2 years)

18155	ad. ♀	11.10.62	Fair Isle
	v	18.10.64	Goé: 50°36′N. 5°57′E. (Liège) **Belgium**
H15781	1stW. ♂	1.1.64	Prestwick Carr: 55°03′N. 1°44′W. (Northumberland) NRG
	/?/	19.10.64	Jupille: 50°38′N. 5°38′E. (Liège) **Belgium**
H70599	1stW. ♀	9.11.63	Walton: 53°24′N. 2°37′W. (Lancashire) MRG
	()	24.10.64	Eksaarde: 51°09′N. 3°58′E. (East Flanders) **Belgium**
596109	f.g. ♀	25.1.64	Thorpe: 52°37′N. 1°18′E. (Norfolk) JFWB
	v	27.10.64	Merksem: 51°14′N. 4°29′E. (Antwerpen) **Belgium**
11739	1stW. ♂	3.2.63	Minsmere: 52°14′N. 1°37′W. (Suffolk) HEA
	v	6.4.64	Jupille, **Belgium**
11768	1stW. ♂	3.2.63	Minsmere HEA
	×	9.4.64	Pellworm: 54°32′N. 8°40′E. North Frisian Is. **Germany**

Reed Bunting (*Emberiza schoeniclus*) (46; 30 miles; $6\frac{1}{12}$ years)

1774	f.g. ♀	8.2.59	Grune Point: 54°54′N. 3°21′W. (Cumberland) RS
	×	19.12.64	*near* Egremont (Cumberland) *c.* 30m. S.
09754	1stW. ♂	25.1.64	Belvide Reservoir: 52°41′N. 2°14′W. (Stafford) PD
	v	5.10.64	Knutsford (Cheshire) 43m. N.
26554	1stW. ♂	16.10.64	Dungeness
	v	2.11.64	Wolvercote (Oxford) 110m. NW.
	v	25.4.65	Dungeness

House Sparrow (*Passer domesticus*) (404; 30 miles; $7\frac{8}{12}$ years)

H80377	f.g. ♂	30.4.64	Spurn Point
	×	18.5.64	Emley Woodhouse (York) 70m. W.
80779	juv. ♀	8.9.64	Spurn Point
	v	17.12.64	Beverley (York) 30m. NW.
15710	1stW. ♀	11.10.63	Gibraltar Point
	×	13.3.64	Scarborough (York) 85m. NNW.
15756	1stW. ♀	1.11.63	Gibraltar Point
	v	8.3.64	Sandall, Doncaster (York) 65m. WNW.
78041	1stW. ♂	20.1.62	Holland-on-Sea: 51°48′N. 1°13′E. (Essex) DW
	×	(16.11.64)	Wrentham, Benacre (Suffolk) 42m. N.

Tree Sparrow (*Passer montanus*) (47; 30 miles; $5\frac{1}{12}$ years)

0074	f.g.	12.2.64	Cambridge: 52°12′N. 0°07′E. AWD
	×	9.4.64	Newarp Lightship: 52°45′N. 2°00′E. *off* Norfolk *c.* 85m. ENE.
8822	f.g.	27.3.64	Lane End: 51°37′N. 0°48′W. (Buckingham) SBRG
	v	12.8.64	Hornchurch (Essex) 40m. E.

KEY TO RINGERS' INITIALS IN LIST OF RECOVERIES

HEA	H. E. Axell
JSA	J. S. Ash
JWA	J. W. Allen
AB	A. Belshaw
AAB	Mrs. A. A. Booth
CGB	C. G. Booth
CJB	C. J. Booth
FKB	F. K. Bennett
JAB	J. A. Benington
JFWB	J. F. W. Bruhn
KB	K. Bruce
KBB	K. Brown
PAB	P. A. Banks
RGBB	R. G. B. Brown
RHB	R. H. Brown
AC	A. Cumber
BC	Bruce Campbell
CBC	Cambridge Bird Club
CEJC	C. E. J. Carter
CGDC	C. G. D. Curtis
DC	D. Cabot
DBC	Dingle Bird Club
EC	E. Cohen
JCC	J. C. Cohen
LC	Mrs. L. Cave
MOC	Midlothian Ornithologists' Club
PJC	P. J. Chadwick
PRC	P. R. Catchpole
RC	R. Chestney
RHC	R. H. Charlwood
WC	Winchester College
WAC	W. A. Cook
AWD	A. W. Diamond
GD	G. Downey
MD	M. Densley
PD	P. G. Deans
PGD	P. G. Davis
WGD	W. G. Dye
AWE	A. W. Evans
BE	B. Ebert
MPFE	M. P. F. Elliott
PRE	P. R. Evans
AF	A. Frudd
MAFF	Ministry of Agriculture, Fisheries and Food
WUF	Miss W. U. Flower
BEG	Brathay Exploration Group
CRG	Cleethorpes Ringing Group
DJG	D. J. Godfrey
EAG	the late Miss E. A. Garden
KJG	K. J. Grearson
MBRG	Morecambe Bay Ringing Group
MKRG	Mid-Kent Ringing Group
MRG	Merseyside Ringing Group
NKRG	North Kent Ringing Group
NRG	Northumbria Ringing Group
NSRG	North Solway Ringing Group
PG	P. Goodlad
PRG	P. R. Griffiths
RMRG	Rye Meads Ringing Group
SBRG	South Buckingham Ringing Group
TTRG	Tyne/Tweed Ringing Group
WWRG	Wash Wader-Ringing Group
AGH	A. G. Hurrell
DDH	D. D. Harber
EGH	E. G. Holt
JAH	J. A. Hicks
MJDH	M. J. D. Hirons
CHI	Chichester Ringing Group
EGI	Edward Grey Institute
PHJ	P. Hope Jones
LK	L. Kneale
HL	H. Lapworth
JML	J. M. Langford
DNM	D. N. Makepeace
GRM	G. R. Mountfort
JRM	J. R. Marshall
PJM	P. J. Mawby
PPM	P. P. Mackie
RM	R. Moat
NDMc	N. D. McKee
JN	J. Newsome
JBN	J. B. Nelson
RBN	R. B. Norden
ABO	A. B. Old
BBO	Bradwell Bird Observatory
CBO	Cley Bird Observatory
DBO	Dungeness Bird Observatory
FIBO	Fair Isle Bird Observatory
GFO	G. F. Oates
HBO	Holme Bird Observatory
JCCO	J. C. C. Oliver
MHBO	Monks House Bird Observatory
SABO	St. Agnes Bird Observatory
SkBO	Skokholm Bird Observatory
SlBO	Slapton Bird Observatory
WBO	Walney Bird Observatory
GRMP	G. R. M. Pepler
IVBP	I. V. Balfour-Paul
JHP	J. H. Phillips
NDP	N. D. Pullen
WMP	W. M. Peet
CMR	C. M. Reynolds
KR	K. Robinson
RWR	R. W. Robson
TFR	T. F. Richardson
AKS	A. K. Searle
ANS	A. N. Sykes
ARS	Adwick-le-Street Ringing Station
BHRS	Beachy Head Ringing Station
CHRS	Christchurch Harbour Ringing Station
CVRS	Chew Valley Ringing Station
DS	D. Shepherd

DAS	D. A. Stone
JAS	J. A. Sayer
KRS	Knaresborough Ringing Station
OOS	Oxford Ornithological Society
RS	R. Stokoe
RKS	R. K. Summerfield
RRS	Romford Ringing Station
RTS	R. T. Smith
RWJS	R. W. J. Smith
SS	Sedbergh School
SNHS	Sorby Natural History Society
WNS	Wharfedale Naturalists' Society
WWFS	West Wales Field Society
HST	H. S. Taylor
MPT	M. P. Taylor
SKT	Miss S. K. Taylor
WT	Wildfowl Trust
WHT	W. H. Tickle
AU	Aberdeen University
ABW	A. B. Watson
AJW	A. J. Waller
CW	C. Winn
CBW	Maj. Gen. C. B. Wainwright
DW	D. R. Watson
DRW	D. R. Wilson
GLW	G. L. Webber
JW	J. Wright
JAW	J. A. Wigzell
JGW	J. G. Williams
JKW	J. K. Weston
JNTW	J. Wilson
PW	P. Wormell
VSW	V. S. Wiseman
PY	P. Yeoman
B&I	Boddy & Ingram
C&F	Collier & Forster
C&L	Clissold & Little
C&PM	C. & P. Minton
G&W	Goodin & Whalley
L&JW	L. & J. Weller
M&B	Mead & Boddy
ND&N	Northumberland, Durham & Newcastle N.H.S.
S&B	Sorensen & Burgess
SS&W	Sanderson, Summersgill & Walker
W&E	Watson & Ennis
WP&M	Wilson, Ponting & McLean

Recoveries in Great Britain and Ireland of birds ringed abroad

By Robert Hudson

During 1964, 773 recoveries were notified. These involved 74 species, of which two—Storm Petrel *Hydrobates pelagicus* and Eider *Somateria mollissima*—are appearing in these lists for the first time. It is not surprising, perhaps, that this should be the first British recovery of a Storm Petrel ringed outside Britain and Ireland since few are ringed elsewhere; the Eider, however, was long-overdue, and is the first good clue to the origin of the Eiders which in recent years have wintered in numbers off the south and east coasts of England.

Quality has been the keynote of 1964. Particularly noteworthy is the recovery in Perthshire of a Jugoslav Spoonbill *Platalea leucorodia*, the first recorded east-west movement across Europe of this attractive bird. Ringing in Saxony (south-east Germany) resulted in two unusual movements: a Marsh Harrier *Circus aeruginosus* to Gloucestershire and a Long-eared Owl *Asio otus* to Durham. A Common Scoter *Melanitta nigra* from the Gulf of Finland and a Little Stint *Calidris minuta* and a Ruff *Philomachus pugnax* from Sweden were only the second foreign-ringed recoveries of these species in Britain. Another Soviet Razorbill *Alca torda*, this time in Flintshire, was only the fifth ever British record of the northern race and yet the third to be provided by a ringing recovery. Among the smaller species, mention must be made of a Swallow *Hirundo rustica* from Italy; a Scandinavian Robin *Erithacus rubecula* apparently wintering in Sussex; a Sedge Warbler *Acrocephalus schoenobaenus* from the Netherlands to Cumberland; a Willow Warbler *Phylloscopus trochilus* from Germany to Ross-shire; and a Spotted Flycatcher *Muscicapa striata* from Spain to Cornwall.

Selected list of recoveries reported during 1964

The symbols and terms are the same as those used in the 'Report on bird-ringing' (see pages 533-583), with the exception that the term 'juv.' cannot always be relied upon to signify a young bird able to fly freely; owing to lack of unanimity in the various ringing schemes, this term may sometimes mean a chick (=pullus).

One innovation is made in the present list. After each scientific name the number of recoveries notified during 1964 and the grand total for the species are stated in brackets. Totals for birds not represented in this list may be found in the 'Summary of foreign-ringed birds in Britain and Ireland during 1906-63' (*Brit. Birds*, 58: 87-97).

·bbreviations used for ringing schemes

	Arnhem (formerly Leiden)	*O.*	Oslo
	Statensviltundersökelser, Ås, Norway	*P.*	Paris
		Pg.	Prague
	Brussels	*P.V.*	Polonia Varsovia
	Bologna	*R.*	Radolfzell
	Copenhagen	*Rk.*	Reykjavik
	Heligoland	*S.S.*	Grupo Aranzadi, San Sebastian
	Hiddensee	*St.*	Stockholm
i.	Helsinki	*St.Orn.*	Stockholm 'Ornis' (Sveriges Ornithologiska Förening)
	Société Jersiaise		
	Count Lippens, Belgium	*Stav.*	Stavanger
	Moscow	*Sv.J.F.*	Svenska Jägare Förbundet
ʼ.	Madrid	*Z.*	Zagreb

Storm Petrel (*Hydrobates pelagicus*) (1; 1)

.	ad.	6.8.63	Burhou: 49°44′N. 2°15′W. (Alderney) **Channel Islands**
·146	×	16.9.64	Burton Bradstock: 51°42′N. 2°44′W. (Dorset)

Gannet (*Sula bassana*) (1; 13)

.	pull.	2.8.63	Les Etacs: 49°42′N. 2°15′W. (Alderney) **Channel Islands**
·125	×	8.11.64	Clacton-on-Sea: 51°48′N. 1°09′E. (Essex)

Heron (*Ardea cinerea*) (7; 205)

·J.F.	pull.	9.6.60	*near* Mönsterås: 57°04′N. 16°37′E. (Småland) **Sweden**
·726	×	26.10.60	*near* Tutbury: 52°52′N. 1°40′W. (Stafford)
·Orn.	pull.	8.6.60	*near* Mönsterås, **Sweden**
·509	+	1.12.60	Bangor Erris: 54°09′N. 9°44′W. (Mayo)
·v.	pull.	8.7.62	*near* Egersund: 58°28′N. 6°10′E. (Rogaland) **Norway**
·045	×	1.4.63	Golspie: 57°59′N. 3°59′W. (Sutherland)
·v.	pull.	2.6.63	*near* Egersund, Norway
·460	×	28.9.63	River Penk: *c.* 52°35′N. 2°10′W. (Stafford)
	pull.	7.5.59	Terschelling: 53°22′N. 5°14′E., Frisian Islands, **Netherlands**
·085	×	30.3.62	Woodbridge: 52°06′N. 1°19′E. (Suffolk)
	pull.	15.4.61	Middenbeemster: 52°33′N. 4°55′E. (Noord Holland) **Netherlands**
·456	×	26.1.62	Rayne: 51°53′N. 0°30′E. (Essex)
	pull.	19.4.61	Amsterdam: 52°21′N. 4°56′E. (Noord Holland) **Netherlands**
·492	×	24.12.61	Caister: 52°39′N. 1°44′E. (Norfolk)

Spoonbill (*Platalea leucorodia*) (1; 3)

	pull.	22.6.64	*near* Krapje: 45°18′N. 16°50′E. (Hrvatska) **Jugoslavia**
10081	+	5.11.64	*near* Perth: 56°25′N. 3°30′W.

·ringed Spoonbill, doubtless the above, was seen on 28th October 1964 near ·airgowrie, 56°36′N. 3°21′W. Reports of a Spoonbill elsewhere in Perthshire ·d also in Nairn and Fife between 16th July and 19th October 1964 may possibly ·fer to the same individual (see *Scot. Birds,* 3: 310-311). This appears to be the ·st Spoonbill ringed in eastern Europe to be recovered in western Europe.

Mallard (*Anas platyrhynchos*) (24; 331)

·e 24 recoveries had been ringed in Finland (one), Sweden (two), Denmark (two), ·ermany (one), Netherlands (eleven) and Belgium (seven).

Teal (*Anas crecca*) (127; 1,449)

In addition to the five records detailed below, there were 122 reports of Teal that had been ringed in Finland (three), Sweden (one), Denmark (four), Netherlands (103), Belgium (five) and France (six).

Rk.	pull.	3.7.63	Skipalón: 65°47′N. 18°12′W., **Iceland**
59407	×	30.3.64	Much Hoole: 53°41′N. 2°49′W. (Lancashire)
Rk.	f.g.	19.8.63	Skipalón, **Iceland**
59452	+	13.1.64	Bolney: 50°59′N. 0°13′W. (Sussex)
M.	juv.	2.8.60	River Pesha: 66°47′N. 47°40′E. (Arkhangel) **U.S.S.R.**
D526366	+	9.1.64	Abbeyleix: 52°55′N. 7°21′W. (Leix)
M.	ad.	6.8.64	Kandalaksha: 67°02′N. 32°35′E. (Murmansk) **U.S.S.R.**
E627833	+	16.10.64	*near* Thirsk: 54°11′N. 1°18′W. (York)
M.	ad. ♂	5.7.64	*near* Staraya Russa: 57°59′N. 31°22′E. (Novgorod) **U.S.S.R.**
E641413	+	14.9.64	Walton-on-Naze: 51°51′N. 1°16′E. (Essex)

Wigeon (*Anas penelope*) (12; 183)

With the one exception below, all had been ringed in autumn/winter in the Netherlands.

Rk.	pull.	5.8.56	Arhvammur: 65°46′N. 17°16′W., Laxardalur, **Iceland**
44811	+	*before* 1963	Wexford Harbour: *c.* 52°22′N. 6°25′W.

Pintail (*Anas acuta*) (12; 61)

Rk.	pull.	10.7.64	Skipalón: 65°47′N. 18°12′W., **Iceland**
37793	+	19.9.64	Grangemouth: 56°01′N. 3°44′W. (Stirling)

The remainder had been ringed in autumn or winter in Denmark (one) and the Netherlands (ten).

Shoveler (*Spatula clypeata*) (8; 52)

M.	pull. ♀	15.6.62	Lake Kanieris: 57°00′N. 23°28′E., **Latvian S.S.R.**
D501115	+	31.12.62	Blennerville: 52°16′N. 9°44′W. (Kerry)

In addition, there were seven recoveries of Shovelers that had been ringed in the Netherlands outside the breeding season.

Scaup (*Aythya marila*) (1; 61)

Rk.	pull.	3.9.54	Lambavatn: 65°30′N. 24°07′W., Raudisandur, **Iceland**
44404	+	0.1.57	*near* Clonakilty: 51°37′N. 8°54′W. (Cork)

Tufted Duck (*Aythya fuligula*) (5; 73)

M.	pull.	13.6.64	Lake Engure: 57°17′N. 23°07′E., **Latvian S.S.R.**
Ж20728	+	(18.11.64)	*near* Airdrie: 55°52′N. 3°59′W. (Lanark)
Hki.	ad. ♀	5.7.60	*near* Björköby: 63°25′N. 21°10′E. (Vaasa) **Finland**
H34297	+	*c.* 5.1.63	Marple: 53°23′N. 2°04′W. (Cheshire)
St.	juv.	17.8.58	*near* Malmö: 55°35′N. 13°00′E. (Skåne) **Sweden**
U79179	+	2.1.60	Belturbet: 54°08′N. 7°20′W. (Cavan)

	juv. ♂	10.1.61	Lekkerkerk: 51°55′N. 4°43′E. (Zuid Holland) **Netherlands**
6557	+	*mid*-10.61	Egremont: 54°29′N. 3°33′W. (Cumberland)
	juv. ♂	7.1.61	Lekkerkerk, **Netherlands**
6664	+	13.1.62	River Nene: 52°16′N. 0°44′W. (Northampton)

Pochard (*Aythya ferina*) (7; 22)

	ad. ♀	30.6.62	Lake Engure: 57°17′N. 23°07′E., **Latvian S.S.R.**
7588	+	3.12.64	Galway Bay: 53°15′N. 9°20′W.
	pull.	20.6.63	Lake Engure, **Latvian S.S.R.**
3919	+	17.12.63	*near* Droitwich: 52°16′N. 2°11′W. (Worcester)
	pull.	6.6.64	Lake Engure, **Latvian S.S.R.**
7042	+	12.12.64	Iver: 51°32′N. 0°30′W. (Buckingham)
	juv.	15.8.63	Nakskov: 54°50′N. 11°10′E. (Lolland) **Denmark**
238	× (*dog*)	0.9.64	Cambuslang: 55°50′N. 4°10′W. (Lanark)
	adult	19.8.63	Nakskov, **Denmark**
53	× (*oil*)	22.1.64	Lowestoft: 52°29′N. 1°46′E. (Suffolk)
	ad. ♂	30.10.63	Nakskov, **Denmark**
530	×	*c.* 9.1.64	Walthamstow Reservoirs: 51°35′N. 0°03′W. (Essex)
	f.g. ♂	23.7.61	*near* Breclav: 48°47′N. 16°43′E., **Czechoslovakia**
6538	+	0.1.64	Walney Island: 54°05′N. 3°15′W. (Lancashire)

Goldeneye (*Bucephala clangula*) (2; 9)

	pull.	16.7.63	Meråker: 63°28′N. 11°45′E. (Nord-Trøndelag) **Norway**
7	×	6.1.64	Berwick-on-Tweed: 55°47′N. 2°00′W. (Northumberland)
	ad. ♀	26.5.63	*near* Särkisalo: 60°02′N. 22°57′E. (Turku ja Pori) **Finland**
525	×	31.1.64	Hickling Broad: 52°45′N. 1°35′E. (Norfolk)

Eider (*Somateria mollissima*) (1; 1)

	pull.	24.7.64	Oost Vlieland: 53°18′N. 5°06′E., Frisian Islands, **Netherlands**
522	+	0.12.64	Eastchurch: 51°24′N. 0°53′E., Sheppey (Kent)

s recovery, the first of its kind, supports the suggestion made by J. H. Taverner Eiders wintering in southern England are most likely of Dutch origin (cf. *Birds,* 52: 255; 56: 284).

Common Scoter (*Melanitta nigra*) (1; 2)

te mark	f.g.	1.10.62	Suursaari: 60°04′N. 27°00′E., Gulf of Finland, **U.S.S.R.**
	× (*oil*)	0.12.64	*near* Formby: 53°34′N. 3°04′W. (Lancashire)

only previous foreign-ringed recovery of this species in Britain (in 1949) was from the Formby area; it had been ringed in Iceland.

Shelduck (*Tadorna tadorna*) (5; 71)

ive were ringed while in flightless moult in the Weser or Elbe estuaries, north-: Germany. The following is the only one recovered in the breeding season:

	f.g. ♀	11.9.60	River Weser estuary: 53°50′N. 8°25′E., **Germany**
354	× (*on nest*)	28.5.63	Kinnaber: 56°43′N. 2°28′W. (Angus)

White-fronted Goose (*Anser albifrons*) (6; 182)

C.	juv.	14.7.57	Sarqaq Dalen: 70°06′N. 52°08′W. (Jakobshavn) **Greenland**
272986	+	*before* 1963	South Slobs: 52°22′N. 6°25′W. (Wexford)
C.	ad.	29.7.55	Sarqaq Dalen, **Greenland**
273361	+	*before* 1963	South Slobs (Wexford)
A.	ad. ♂	16.3.56	Bunschoten: 52°14′N. 5°22′E. (Utrecht) **Netherlands**
304388	v	6.3.61	Slimbridge: 51°44′N. 2°25′W. (Gloucester)
A.	ad. ♂	15.2.58	Bunschoten, **Netherlands**
304901	+	21.1.62	Forden: 52°37′N. 3°08′W. (Montgomery)
A.	juv. ♂	15.1.60	Bunschoten, **Netherlands**
8000245	/?/	1.1.64	*near* Southminster: 51°40′N. 0°54′E. (Essex)
A.	ad. ♂	11.1.62	Nijega: 53°07′N. 6°03′E. (Friesland) **Netherlands**
8003050	+	20.1.64	Frampton-on-Severn: 51°46′N. 2°22′W. (Gloucester)

Pink-footed Goose (*Anser brachyrhynchus*) (33; 1,997)

All 33 recoveries resulted from the Wildfowl Trust's expedition to central Iceland in 1953; for the first time there are no recoveries from those ringed there in 1951.

Barnacle Goose (*Branta leucopsis*) (4; 134)

Stav.	ad.	24.7.62	Hornsund: *c.* 77°00′N. 14°30′E., **Spitsbergen**
309582	×	18.12.63	Solway Firth: *c.* 54°45′N. 4°00′W. (Kirkcudbright)
Stav.	ad.	24.7.62	Hornsund, **Spitsbergen**
309515	×	*end*-4.64	*near* Annan: *c.* 54°55′N. 3°15′W. (Dumfries)
Ås	ad.	20.7.62	Hornsund, **Spitsbergen**
20192	×	17.2.64	*near* Caerlaverock: 55°00′N. 3°31′W. (Dumfries)
Ås	ad.	23.7.62	Hornsund, **Spitsbergen**
20400	v	15/27.11.64	Tayfield: 56°27′N. 2°56′W., Newport (Fife)

Further proof of the connection between the wintering grounds of Barnacle Geese on the Solway Firth and the breeding area in Spitsbergen may be found in the 'Report on bird-ringing in 1964' (page 551).

Whooper Swan (*Cygnus cygnus*) (1; 5)

Rk.	pull.	8.8.63	Ulfsvatn: 64°54′N. 20°35′W., **Iceland**
086	×A	0.4.64	Fort Augustus: 57°08′N. 4°41′W. (Inverness)

Sparrowhawk (*Accipiter nisus*) (1; 14)

Stav.	pull.	30.6.63	Ljordalen: 61°28′N. 12°31′E. (Hedmark) **Norway**
618249	/?/	25.9.63	South Dogger Bank: *c.* 54°00′N. 2°00′E., North Sea

Marsh Harrier (*Circus aeruginosus*) (1; 2)

R.	pull. ♂	30.6.63	Torgau: 51°34′N. 13°01′E. (Sachsen) **Germany**
D15449	×A	22.5.64	Snowshill: 52°01′N. 1°52′W., Winchcombe (Gloucester)

The only previous foreign-ringed recovery of a Marsh Harrier in Britain was of one ringed as pullus in Denmark in 1941 and found dead in Orkney three years later.

Merlin (*Falco columbarius*) (1; 6)

Rk.	pull.	8.7.62	Stykkishólmur: 65°00′N. 22°39′W., **Iceland**
613087	× (*wires*)	(3.3.64)	*between* Castlebar and Westport: *c.* 53°50′N. 9°23′W. (Mayo)

Kestrel (*Falco tinnunculus*) (1; 13)

	pull.	30.6.62	*near* Sneek: 53°03′N. 5°41′E. (Friesland) **Netherlands**
296	×	5.8.62	North Dogger Bank: *c.* 55°45′N. 2°30′E., North Sea

Water Rail (*Rallus aquaticus*) (1; 7)

	juv.	2.9.61	Rantum/Sylt: 54°50′N. 8°18′E., North Frisian Islands, **Germany**
001	× (*dog*)	5.1.62	Wadebridge: 50°32′N. 4°50′W. (Cornwall)

Moorhen (*Gallinula chloropus*) (2; 24)

	juv.	5.8.61	Reeuwijk: 52°03′N. 4°43′E. (Zuid Holland) **Netherlands**
71	× (*wires*)	3.11.62	Catworth: 52°21′N. 0°25′W. (Huntingdon)
	ad. ♂	18.11.63	Oudesluis: 52°50′N. 4°47′E. (Noord Holland) **Netherlands**
137	+	*early*-1.64	Messing: 51°51′N. 0°46′E. (Essex)

Coot (*Fulica atra*) (2; 11)

	pull.	4.7.63	Rantum/Sylt: 54°50′N. 8°18′E., North Frisian Islands, **Germany**
645	v	5.11.63	Fair Isle: 59°32′N. 1°37′W. (Shetland)
	f.g.	16.3.63	Buitenhuizen: 52°26′N. 4°42′E. (Noord Holland) **Netherlands**
302	×	10.1.64	Chilton Trinity: 51°08′N. 3°00′W. (Somerset)

Oystercatcher (*Haematopus ostralegus*) (2; 43)

	pull.	22.6.63	*near* Frosta: 63°35′N. 10°37′E. (Nord-Trondelag) **Norway**
98	+	22.1.64	Heysham: 54°03′N. 2°54′W. (Lancashire)
	pull.	8.7.63	*near* Gjemnes: 62°56′N. 7°43′E. (More og Romsdal) **Norway**
92	×	24.12.63	*near* Colwyn Bay: 53°19′N. 3°44′W. (Denbigh)

Lapwing (*Vanellus vanellus*) (7; 258)

	pull.	31.5.55	*near* Elbergen: 52°27′N. 7°18′E. (Niedersachsen) **Germany**
131	×	12.12.64	*near* Swaffham: 52°39′N. 0°41′E. (Norfolk)
	pull.	24.5.64	Wedel: 53°34′N. 9°42′E. (Schleswig-Holstein) **Germany**
150	×	0.8.64	Pytchley: 52°22′N. 0°44′W. (Northampton)
	pull.	30.5.64	Meldorf: 54°06′N. 9°04′E. (Schleswig-Holstein) **Germany**
47	×	27.7.64	South Walsham: 52°39′N. 1°30′E. (Norfolk)
	pull.	19.5.63	Bisses: 50°24′N. 8°54′E. (Hessen) **Germany**
494	×	0.1.64	Neath: 51°39′N. 3°50′W. (Glamorgan)
	pull.	18.6.61	Gorredijk: 53°00′N. 6°04′E. (Friesland) **Netherlands**
34	+	18.2.62	Newcastle West: 52°27′N. 9°03′W. (Limerick)
	pull.	5.6.58	Beetsterzwaag: 53°04′N. 6°05′E. (Friesland) **Netherlands**
9	()	1.1.62	Kilmona: 51°59′N. 8°35′W. (Cork)
	pull.	10.5.62	Brecht: 51°21′N. 4°38′E. (Antwerp) **Belgium**
71	×	12.8.62	Chichester: 50°50′N. 0°48′W. (Sussex)

Golden Plover (*Charadrius apricarius*) (5; 82)

	ad.	29.4.59	*near* Midnes: 64°04′N. 22°43′W., **Iceland**
6	+	11.1.64	Strangford Lough: *c.* 54°30′N. 5°40′W. (Down)
	f.g.	2.10.60	*near* Midnes, **Iceland**
7	+	*c.* 18.10.64	Tuam: 53°31′N. 8°50′W. (Galway)
	ad.	22.4.61	*near* Midnes, **Iceland**
3	×	25.1.64	Carnwath: 55°42′N. 3°37′W. (Lanark)

Rk.	f.g.	19.10.64	*near* Midnes, **Iceland**
615352	+	19.12.64	*near* Galway City: 53°16′N. 9°03′W.
P.	f.g.	31.12.62	Ouessant: 48°28′N. 5°05′W. (Finistère) **France**
GM4350	()	24.10.64	Forth: 55°46′N. 3°42′W. (Lanark)

Turnstone (*Arenaria interpres*) (1; 19)

Rk.	ad.	23.5.61	*near* Midnes: 64°04′N. 22°43′W., **Iceland**
711408	× (*net*)	(5.1.62)	Quilty: 52°49′N. 9°28′W. (Clare)

Snipe (*Gallinago gallinago*) (8; 91)

Hki.	pull.	17.6.62	*near* Lapväärti: 62°13′N. 21°25′E. (Vaasa) **Finland**
A193741	+	12.1.63	Cirencester: 51°44′N. 1°59′W. (Gloucester)
Hki.	f.g.	12.7.59	*near* Pori: 61°28′N. 21°45′E., **Finland**
B32052	×	25.12.62	Haverfordwest: 51°49′N. 4°58′W. (Pembroke)
Hki.	f.g.	21.8.59	*near* Pori, **Finland**
B32033	× (*cat*)	9.1.63	Peterborough: 52°35′N. 0°15′W. (Northampton)
Hki.	juv.	25.7.64	*near* Pori, **Finland**
B32611	v	5.12.64	Bamburgh: 55°36′N. 1°42′W. (Northumberland)
St.Orn.	f.g.	16.9.60	Ledskär: 60°31′N. 17°43′E. (Uppland) **Sweden**
713130	×	13.12.60	Cambridge: 52°12′N. 0°07′E.
He.	pull.	3.8.64	*near* Klein Thurow: 53°47′N. 10°52′E. (Mecklenburg) **Germany**
7009190	+	1.9.64	Caerlaverock: 54°58′N. 3°26′W. (Dumfries)
A.	f.g.	29.8.61	Zwarte Meer: 52°38′N. 6°00′E. (Overijssel) **Netherlands**
K81316	+	29.1.62	Castlebar: 53°52′N. 9°17′W. (Mayo)
A.	f.g.	18.8.62	Reeuwijk: 52°03′N. 4°43′E. (Zuid Holland) **Netherlands**
K145651	+	17.11.62	Peover: 53°16′N. 2°22′W. (Cheshire)

Woodcock (*Scolopax rusticola*) (1; 52)

C.	ad.	20.12.63	Tved: 57°03′N. 8°39′E. (Jutland) **Denmark**
640685	+	21.12.64	Morston: 52°57′N. 0°59′E. (Norfolk)

Curlew (*Numenius arquata*) (16; 150)

All 16 had been ringed as pullus in the usual areas: Finland (eleven), Sweden (one), Norway (two), Germany (one) and the Netherlands (one).

Redshank (*Tringa totanus*) (2; 21)

C.	(? age)	2.5.60	Amager: 55°40′N. 12°38′E., **Denmark**
689433	+	(24.1.63)	Hayling Island: 50°48′N. 0°59′W. (Hampshire)
Rk.	f.g.	4.8.63	*near* Midnes: 64°04′N. 22°43′W., **Iceland**
716006	×	26.12.64	Leuchars: 56°22′N. 2°53′W. (Fife)

Knot (*Calidris canutus*) (2; 55)

Stav.	ad.	29.8.56	Revtangen: 58°45′N. 5°30′E. (Rogaland) **Norway**
Z2180	v	16.2.64	Benington: 53°00′N. 0°05′E. (Lincoln)
St.Orn.	juv.	30.8.62	Åhus: 55°55′N. 14°20′E. (Skåne) **Sweden**
526318	×	(29.6.64)	Frampton Marsh: 52°56′N. 0°01′W. (Lincoln)

Little Stint (*Calidris minuta*) (1; 2)

St.	juv.	2.9.64	*near* Trönninge: 56°36′N. 12°56′E. (Halland) **Sweden**
2144173	v	26.9.64	Breydon Water: 52°37′N. 1°42′E. (Norfolk)

Dunlin (*Calidris alpina*) (54; 312)

	f.g.	21.7.64	*near* Midnes: 64°04′N. 22°43′W., **Iceland**
.63	× (*wires*)	(7.8.64)	Kilcoole Marsh: 53°06′N. 6°04′W. (Wicklow)
..	ad.	22.7.64	Mikoszewo: 54°21′N. 18°57′E. (Gdańsk) **Poland**
12252	× (*net*)	10.12.64	West Kirby: 53°22′N. 3°10′W. (Cheshire)
..	juv.	26.8.64	Mikoszewo, **Poland**
11881	v	4.12.64	Benington: 53°00′N. 0°05′E. (Lincoln)
..	ad.	29.8.64	Mikoszewo, **Poland**
11996	v	8.11.64	Harty: 51°22′N. 0°55′E., Sheppey (Kent)

: above are, respectively, the third Dunlin from Iceland and the second, third : fourth from Poland. Other recoveries concerned ones ringed on passage in winter in Finland (three), Sweden (27), Norway (eleven), Denmark (two), rmany (four), Netherlands (two) and Belgium (one).

Ruff (*Philomachus pugnax*) (1; 2)

	juv.	8.9.60	Getterön: 57°08′N. 12°13′E. (Halland) **Sweden**
:218	×	0.10.60	Kinver: 52°27′N. 2°14′W. (Stafford)

Great Skua (*Catharacta skua*) (1; 3)

	pull.	31.7.63	Breidamerkursandur: 64°02′N. 16°12′W., **Iceland**
:28	×	30.3.64	Reighton: 54°10′N. 0°16′W., Filey (York)

Great Black-backed Gull (*Larus marinus*) (1; 110)

	pull.	5.6.60	*near* Klepp: 58°44′N. 5°33′E. (Rogaland) **Norway**
78	×	24.3.63	Grimsby: 53°35′N. 0°05′W. (Lincoln)

Herring Gull (*Larus argentatus*) (6; 81)

	pull.	27.6.60	Great Ainov Island: 68°50′N. 31°35′E. (Murmansk) **U.S.S.R.**
1572	×	15.3.64	Carlton Colville: 52°27′N. 1°42′E. (Suffolk)
	pull.	3.7.60	Great Ainov Island, **U.S.S.R.**
1889	×	*spring* 1964	Dartford: 51°27′N. 0°14′E. (Kent)
	pull.	17.7.63	Loppa: 70°20′N. 21°28′E. (Finnmark) **Norway**
19	×	0.4.64	Bradwell-on-Sea: 51°44′N. 0°54′E. (Essex)
	pull.	21.7.57	Bleik: 69°17′N. 16°00′E., Vesterålen (Nordland) **Norway**
99	×	4.12.63	Hersham: 51°22′N. 0°25′W. (Surrey)
	pull.	20.6.59	Hallands Väderö: 56°25′N. 12°33′E. (Skåne) **Sweden**
176	×	27.7.60	Allonby: 54°46′N. 3°25′W. (Cumberland)
	pull.	1.7.59	Texel: 53°03′N. 4°43′E., Frisian Islands, **Netherlands**
17	×	0.3.64	Winterton: 52°43′N. 1°43′E. (Norfolk)

first four above are from within the range of *L. a. omissus*. Texel is the res-ed type locality of *L. a. argenteus*, if this race is accepted. By common consent, Herring Gulls of south Sweden (including Skane) are of the typical race.

Common Gull (*Larus canus*) (38; 746)

se originated in Estonia (three), Finland (eleven), Sweden (seven), Norway (14), nany (two) and the Netherlands (one). None calls for special mention.

Black-headed Gull (*Larus ridibundus*) (179; 1,771)

Rk.	pull.	20.6.62	Skipalón: 65°47′N. 18°12′W., **Iceland**
613627	×	2.2.64	Coolmain: 51°42′N. 8°37′W. (Cork)
P.	f.g.	3.2.63	Chaillevette: 45°44′N. 1°03′W. (Charente Maritime) **France**
GH1772	v	5.9.64	Bradwell-on-Sea: 51°44′N. 0°54′E. (Essex)

The latter is the first French-ringed Black-headed Gull to be recovered in this country. The remainder originated in Estonia (seven), Latvia (17), Finland (52), Sweden (18), Norway (25), Denmark (three), Germany (six), Poland (seven), Czechoslovakia (six), the Netherlands (34) and Belgium (two).

Common Tern (*Sterna hirundo*) (3; 24)

Hki.	pull.	5.7.62	*near* Virolahti: 60°25′N. 27°40′E. (Kymi) **Finland**
A134112	×	31.7.64	Dungeness: 50°55′N. 0°59′E. (Kent)
Hki.	pull.	15.6.64	*near* Esbo: 60°07′N. 24°47′E. (Uusimaa) **Finland**
A203262	×	*c.* 16.8.64	Eastbourne: 50°46′N. 0°17′E. (Sussex)
O.	pull.	1.7.60	*near* Asker: 59°52′N. 10°34′E. (Akershus) **Norway**
44988	×	10.9.60	Southwold: 52°20′N. 1°40′E. (Suffolk)

Arctic Tern (*Sterna macrura*) (1; 13)

H.	pull.	0.6.64	Langenwerder: 54°02′N. 11°30′E., Poel Island (Mecklenburg) **Germany**
7420236	×	23.7.64	Cresswell: 55°15′N. 1°31′W. (Northumberland)

Sandwich Tern (*Sterna sandvicensis*) (3; 12)

H.	pull.	18.6.64	Trischen: 54°03′N. 8°40′E., Elbe estuary, **Germany**
6213857	v	4.9.64	Benington: 53°00′N. 0°05′E. (Lincoln)
H.	pull.	4.7.63	Scharhörn: 53°57′N. 8°26′E., Elbe estuary, **Germany**
6220380	/?/	0.7.63	Rainham: 51°32′N. 0°12′E. (Essex)
H.	pull.	11.6.64	Scharhörn, **Germany**
6228744	×	18.8.64	Barton-on-Sea: 50°44′N. 1°40′W. (Hampshire)

Razorbill (*Alca torda*) (1; 4)

M.	pull.	26.7.61	Onega Bay: *c.* 64°00′N. 38°10′E. (Arkhangel) **U.S.S.R.**
E627322	×	7.2.64	Rhyl: 53°19′N. 3°29′W. (Flint)

This is the fifth British record of the northern (typical) race, and the third to be provided by a ringing recovery.

Puffin (*Fratercula arctica*) (1; 7)

Jer.	ad.	23.6.55	Burhou: 49°44′N. 2°15′W. (Alderney) **Channel Islands**
H723	× (*oil*)	*c.* 13.9.64	Hengistbury Head: 50°43′N. 1°45′W. (Hampshire)

Collared Dove (*Streptopelia decaocto*) (3; 4)

B.	pull.	9.5.61	Duinbergen: 51°21′N. 3°16′E. (West Flanders) **Belgium**
5E3703	×	7.9.63	Whitstable: 51°22′N. 1°02′E. (Kent)
A.	f.g.	25.1.64	*caught* Wageningen: 51°58′N. 5°41′E. (Gelderland), *released* Barneveld: 52°08′N. 5°35′E. (Gelderland) **Netherlands**
1007686	v	26.9.64	South Benfleet: 51°33′N. 0°33′E. (Essex)

	ad. ♂	26.12.63	Herford: 52°07′N. 8°40′E. (Nordrhein-Westfalen) **Germany**
194	×	c. 20.11.64	Sunderland: 54°54′N. 1°25′W. (Durham)

last two recoveries were mentioned in 'The spread of the Collared Dove in ain and Ireland' (*Brit. Birds,* 58: 131), but the Belgian-ringed one has only ntly been notified.

Long-eared Owl (*Asio otus*) (2; 12)

	pull.	9.6.63	Zwönitz: 50°38′N. 12°49′E. (Sachsen) **Germany**
51	×	27.12.64	South Hetton: 54°49′N. 1°27′W. (Durham)
	pull.	20.5.64	Den Helder: 52°56′N. 4°44′E. (Noord Holland) **Netherlands**
26	v	7.10.64	Spurn Point: 53°35′N. 0°06′E. (York)

Short-eared Owl (*Asio flammeus*) (1; 2)

	pull.	3.6.63	Borkum: 53°36′N. 6°44′E., East Frisian Islands, **Germany**
510	× (*traffic*)	31.10.64	Little Downham: 52°26′N. 0°15′E. (Cambridge)

Swallow (*Hirundo rustica*) (4; 20)

	ad.	6.5.62	Zandvoorde: 50°49′N. 2°59′E. (West Flanders) **Belgium**
550	+	26.4.64	Copford: 51°52′N. 0°48′E. (Essex)
	ad. ♂	18.5.64	St. Michiels: 51°11′N. 3°12′E. (West Flanders) **Belgium**
039	v	27.8.64	Walton-on-Naze: 51°51′N. 1°16′E. (Essex)
	ad.	26.4.63	Numana: 43°30′N. 13°37′E. (Ancona) **Italy**
062	v	5.9.64	Rye Meads: 51°47′N. 0°00′, Hoddesdon (Hertford)
	ad. ♂	14.4.63	Figuig: 32°10′N. 1°15′W., **Morocco**
35	×	4.4.64	Hurley: 51°33′N. 0°49′W. (Berkshire)

062 is the first Italian-ringed Swallow to be recovered in this country. Three ish-ringed Swallows have been recovered in Italy (strangely, all in 1961), but further east than 9°E.

Sand Martin (*Riparia riparia*) (8; 18)

	f.g.	26.6.64	Nieuw Namen: 51°17′N. 4°10′E. (Zeeland) **Netherlands**
50	v	12.8.64	Wittering: 52°37′N. 0°28′W. (Northampton)
	juv.	14.7.62	Marbaix la Tour: 50°20′N. 4°22′E. (Hainaut) **Belgium**
41	v	12.6.64	Hassocks: 50°56′N. 0°09′W. (Sussex)
	pull.	28.7.63	Oostakker: 51°06′N. 3°45′E. (East Flanders) **Belgium**
323	v	5.7.64	Chartham: 51°16′N. 1°02′E. (Kent)
	f.g.	19.8.63	La Chapelle sur Erdre: 47°18′N. 1°32′W. (Loire Atlantique) **France**
708	v	11.6.64	The Maze: 54°29′N. 6°07′W. (Down)
	f.g.	20.8.63	La Chapelle sur Erdre, **France**
7	v	16.6.64	Cassington: 51°47′N. 1°21′W. (Oxford)
	f.g.	20.8.63	La Chapelle sur Erdre, **France**
19	v	20.7.64	New Marton: 52°55′N. 2°59′W. (Shropshire)
	f.g.	30.8.63	La Chapelle sur Erdre, **France**
8	v	6.6.64	Wolferton: 52°50′N. 0°28′E. (Norfolk)
	v	20.6.64	Wolferton
	juv.	22.8.63	St. Pryve-St. Mesmin: 47°54′N. 1°50′E. (Loiret) **France**
8	v	23.6.64	Eastleigh: 50°58′N. 1°22′W. (Hampshire)

Without exception, all the above were recaptures at breeding colonies. The five French ones had all been ringed in roosts while on southward migration. The increasing number of Sand Martin recoveries reflects growing international co-operation in the study of this species which was initiated in Britain. Further records, notably recaptures by French ringers of British-ringed birds, are given in the 'Report on bird-ringing in 1964' (page 564).

Fieldfare (*Turdus pilaris*) (10; 74)

These originated from the usual areas in Finland (five), Sweden (two) and Norway (three); all had been ringed as nestlings. Five are belated reports of ones that died in the severe winter of 1962/63 (as also are three of the four Redwing recoveries given below).

Song Thrush (*Turdus philomelos*) (2; 44)

Stav.	pull.	20.5.64	*near* Høyland: 58°48′N. 5°41′E. (Rogaland) **Norway**
789344	v	25.9.64	Spurn Point: 53°35′N. 0°06′E. (York)
Jer.	f.g.	19.1.64	St. Clement: 49°10′N. 2°03′W. (Jersey) **Channel Islands**
B8636	v	1.3.64	Ipswich: 52°05′N. 1°13′E. (Suffolk)

Redwing (*Turdus iliacus*) (4; 74)

Hki.	ad.	19.9.61	*near* Tampere: 61°31′N. 23°39′E. (Häme) **Finland**
A162582	×	1.2.63	*near* Ivybridge: 50°23′N. 3°55′W. (Devon)
Hki.	pull.	14.6.62	*near* Hauho: 61°13′N. 24°23′E. (Häme) **Finland**
A180809	×	28.1.63	Drogheda: 53°43′N. 6°20′W. (Louth)
Stav.	pull.	26.5.62	*near* Gjesdal: 58°45′N. 5°54′E. (Rogaland) **Norway**
778617	×	14.2.63	Greenock: 55°56′N. 4°49′W. (Renfrew)
A.	f.g.	8.11.64	Tegelen: 51°20′N. 6°09′E. (Limburg) **Netherlands**
K214669	v	28.12.64	Cliffe: 51°28′N. 0°30′E. (Kent)

Blackbird (*Turdus merula*) (38; 249)

Hki.	ad. ♀	22.10.62	*near* Helsinki: 60°10′N. 24°58′E., **Finland**
B45160	×	8.12.62	Burnham Market: 52°57′N. 0°44′E. (Norfolk)
Hki.	pull.	31.5.62	*near* Helsinki, **Finland**
A147675	× (*cat*)	9.1.63	Ballymoney: 55°04′N. 6°31′W. (Antrim)
Hki.	ad. ♂	10.4.63	*near* Helsinki, **Finland**
A156474	v	1.3.64	*near* Grimsby: 53°33′N. 0°04′W. (Lincoln)
Hki.	ad. ♂	28.4.63	Lågskär: 59°50′N. 19°50′E. (Åland) **Finland**
A179602	v	24.12.64	Kilcreggan: 55°59′N. 4°49′W. (Dunbarton)
	v	11.3.65	Kilcreggan

The other 34 recoveries involved Blackbirds ringed in Sweden (ten), Norway (five), Germany (13), the Netherlands (five) and France (one).

Robin (*Erithacus rubecula*) (2; 10)

St.Orn.	f.g.	5.10.59	Falsterbo: 55°23′N. 12°50′E. (Skåne) **Sweden**
159166	×	(9.11.60)	Sumburgh: 59°51′N. 1°16′W. (Shetland)

ad.	16.2.63	Egersund: 58°27′N. 6°00′E. (Rogaland) **Norway**
× (*traffic*)	13.1.64	Hastings: 50°51′N. 0°36′E. (Sussex)

atter is particularly interesting. Not only was the bird wintering in widely ated areas in different years, but there are few certain records of Continental ms in Britain in mid-winter and this is the first such ringing recovery.

Sedge Warbler (*Acrocephalus schoenobaenus*) (1; 3)

f.g.	9.5.64	De Koog: 53°06′N. 4°48′E., Texel, **Netherlands**
×	5.8.64	Cleator Moor: 54°32′N. 3°31′W. (Cumberland)

Blackcap (*Sylvia atricapilla*) (1; 3)

f.g. ♀	28.8.64	Cap Gris Nez: 50°52′N. 1°35′E. (Pas de Calais) **France**
v	9.9.64	Sandwich Bay: 51°17′N. 1°20′E. (Kent)

Willow Warbler (*Phylloscopus trochilus*) (1; 4)

ad. ♀	11.5.64	Heligoland: 54°11′N. 7°55′E., **Germany**
×	3.7.64	Melvaig: 57°49′N. 5°46′W. (Ross)

Spotted Flycatcher (*Muscicapa striata*) (1; 5)

f.g.	4.9.63	Milagro: 42°15′N. 1°45′W. (Navarra) **Spain**
×	14.6.64	Saltash: 50°24′N. 4°12′W. (Cornwall)

Meadow Pipit (*Anthus pratensis*) (1; 5)

f.g.	7.8.63	Skipalón: 65°47′N. 18°12′W., **Iceland**
×	6.5.64	Carrickart: 55°11′N. 7°47′W. (Donegal)

s only the second Icelandic Meadow Pipit to be recovered in Britain; the us one was found in the Outer Hebrides in 1931! An Essex-ringed recovery land was included in the 'Report on bird-ringing for 1963' (*Brit. Birds,* 57:

White Wagtail (*Motacilla a. alba*) (2; 7)

pull.	25.7.63	Skipalón: 65°47′N. 18°12′W., **Iceland**
× (*hit glass*)	4.5.64	Glen Lochay: 56°29′N. 4°24′W. (Perth)
f.g.	31.7.64	*near* Midnes: 64°04′N. 22°43′W., **Iceland**
v	26.9.64	Slapton: 50°17′N. 3°39′W. (Devon)

Waxwing (*Bombycilla garrulus*) (1; 3)

f.g.	10.10.59	Näsbyn: 65°50′N. 23°14′E., Kalix (Norrbotten) **Sweden**
× A	8.2.60	Motherwell: 55°48′N. 4°00′W. (Lanark)

Starling (*Sturnus vulgaris*) (66: 1,803)

66 recoveries had originated in the Soviet Baltic (eleven), Finland (five), n (ten), Norway (nine), Denmark (six), Germany (two), Poland (one), the lands (18) and Belgium (four). None calls for special comment.

Greenfinch (*Chloris chloris*) (2; 16)

Lp.	f.g.	21.2.62	Le Zoute: 51°21′N. 3°22′E. (West Flanders) **Belgium**
578	v	7.3.64	Norwich: 52°38′N. 1°18′E. (Norfolk)
B.	ad. ♂	11.4.64	Kuringen: 50°57′N. 5°18′E. (Limburg) **Belgium**
2A76050	v	26.12.64	*near* Redhill: 51°14′N. 0°10′W. (Surrey)

Goldfinch (*Carduelis carduelis*) (2; 10)

B.	ad.	12.1.64	Le Zoute: 51°21′N. 3°22′E. (West Flanders) **Belgium**
2A45939	×	26.4.64	Woodbastwick: 52°41′N. 1°25′E. (Norfolk)
S.S.	ad.	15.4.64	Fuenterrabia: 43°21′N. 1°48′W. (Guipuzcoa) **Spain**
A37768	× (*car*)	*c.* 6.5.64	*between* Oxford: 51°45′N. 1°16′W. and Winfrith: 50°39′N. 2°16′W. (Dorset)

The latter was found dead in a car's radiator grill after a journey from Oxford to Winfrith.

Linnet (*Carduelis cannabina*) (1; 14)

S.S.	ad. ♂	14.4.64	Fuenterrabia: 43°21′N. 1°48′W. (Guipuzcoa) **Spain**
A37628	v	18.7.64	Cliffe: 51°28′N. 0°30′E. (Kent)

Lesser Redpoll (*Carduelis flammea cabaret*) (1; 3)

A.	ad.	1.9.63	Vlieland: 53°18′N. 5°04′E., Frisian Islands, **Netherlands**
R31259	v	4.5.64	Isle of May: 56°11′N. 2°33′W.

Chaffinch (*Fringilla coelebs*) (13; 169)

St.	pull.	7.6.59	Grangärde: 60°13′N. 14°58′E. (Dalarna) **Sweden**
ZBJ2582	×	26.2.60	Blackwater: 52°27′N. 6°21′W. (Wexford)

The remaining recoveries had been ringed outside the breeding season in Germany (one), the Netherlands (four) and Belgium (seven).

Brambling (*Fringilla montifringilla*) (3; 20)

B.	f.g. ♀	27.10.64	Kapellan: 51°19′N. 4°26′E. (Antwerp) **Belgium**
2V40359	v	31.12.64	Shotton: 53°12′N. 3°02′W. (Flint)
H.	juv. ♀	28.10.52	*near* Aachen: 50°49′N. 6°05′E. (Nordrhein-Westfalen) **Germany**
8765657	×	0.2.54	*near* Botley: 50°56′N. 1°15′W. (Hampshire)
H.	f.g. ♂	1.10.64	Westerland/Sylt: 54°54′N. 8°18′E., North Frisian Islands, **Germany**
80188746	v	24.12.64	*near* Wellington: 52°42′N. 2°32′W. (Shropshire)

The last two are the first recoveries notified of German-ringed Bramblings in Britain. However, *Auspicium* 2 (2), September 1965, mentions one ringed on Heligoland in 1928 and recovered in Durham the following year.

Tree Sparrow (*Passer montanus*) (1; 2)

B.	ad.	16.2.60	Polleur: 50°32′N. 5°53′E. (Liège) **Belgium**
29B1972	×	*c.* 15.5.64	North Collingham: 53°09′N. 0°45′W. (Nottingham)

Bird observatories in Great Britain and Ireland

s list is arranged alphabetically and is designed to give (i) the name of the warden or director ere there is one; (ii) the address from which particulars may be obtained; and (iii) an indication ccommodation charges and travel routes (charges are, of course, liable to alteration). *Stamped y envelopes should be sent with applications for particulars.*

dsey Bird and Field Observatory, Caernarvonshire. *Warden:* George Evans. *Enquiries:* . G. F. Walton, 51 Mount Road, St. Asaph, Flintshire. *Accommodation:* 12s. 6d. per day luding evening meal); 9 gns. per week (full board) some weeks during May–July. *Travel:* n to Pwllheli; boat from Aberdaron (25s. return, plus island landing charge of 15s.).

dwell Bird Observatory, Essex. *Enquiries:* A. B. Old, Bata Hotel, East Tilbury, Essex. *ommodation:* 4s. or 5s. per night. *Travel:* train to Southminster; bus to Bradwell-on-Sea.

e Clear Bird Observatory, Co. Cork. *Enquiries:* R. D. Jackson, 28 Bartholomew Road, ley, Oxford. *Accommodation:* 5s. per night or 30s. per week. *Travel:* bus or hired car Cork to imore; boat from Baltimore four days a week (10s. return).

f of Man Bird Observatory, Isle of Man. *Warden:* Peter Bennett. *Enquiries:* Secretary, The nx Museum and National Trust, Douglas, Isle of Man. *Accommodation:* 4s. per night. *Travel:* t (£2 17s. 2nd-class return from Liverpool, and also summer sailings from other ports) or ne to Isle of Man; bus to Port St. Mary; small boat to Calf of Man.

y Bird Observatory, Norfolk. Now closed.

eland Bird Observatory, Co. Down. *Enquiries:* C. W. Bailey, 17 Hillside Drive, Belfast 9, rthern Ireland. *Accommodation:* 2s. 6d. per day (maintenance charge to non-members). *el:* bus and boat from Belfast (12s. return).

ngeness Bird Observatory, Kent. *Warden:* R. E. Scott. *Enquiries:* H. A. R. Cawkell, 6 ute Road, Hastings, Sussex. *Accommodation:* 5s. per night. *Travel:* train to Lydd-on-Sea.

r Isle Bird Observatory, Shetland. *Warden:* Roy H. Dennis, Fair Isle Bird Observatory, by wick, Shetland. *Enquiries:* to warden. *Accommodation:* 18s. to 25s. per day (full board). *el:* train to Aberdeen, steamer from Aberdeen to Lerwick or B.E.A. plane from Aberdeen to burgh; boat from Sumburgh to Fair Isle (21s. 6d. return).

raltar Point Bird Observatory and Field Research Station, Lincolnshire. *Enquiries:* E. Smith, Pyewipes, Willoughby, Alford, Lincolnshire (bookings) and R. B. Wilkinson, 3 an Avenue, Skegness, Lincolnshire (research). *Accommodation:* 7s. 6d. per night. *Travel:* n to Skegness.

at Saltee Bird Observatory, Co. Wexford. Now closed.

of May Bird Observatory and Field Station, Fife. *Enquiries:* A. Macdonald, Hadley Court, gate, Haddington, East Lothian (bookings) or Miss N. J. Gordon, 12 Hope Terrace, Edin- gh 9 (general). *Accommodation:* 5s. per night. *Travel:* boat from Anstruther (15s. return); particulars on application.

ey Bird Observatory, Channel Islands. *Enquiries:* A. Le Sueur, Les Hâtivieaux, Val de la e, St. Ouen, Jersey. *Travel:* boat from Weymouth or by air.

dy Field Station and Observatory, off North Devon coast. *Enquiries:* J. C. A. Dyke, ock Avenue, Barnstaple, Devon. *Travel:* M.V. *Lundy Gannet* from Bideford, or Campbell mer from Ilfracombe.

v Grounds, Slimbridge, Gloucestershire (Headquarters of the Wildfowl Trust). *Hon. ctor:* Peter Scott. *Assistant Director (Research):* Dr. G. V. T. Matthews. *Enquiries:* Bookings etary, Wildfowl Trust, Slimbridge, Gloucestershire.

land Bird Observatory and Field Centre, Dorset. *Warden:* Frank Clafton, Portland Bird ervatory, Old Lower Light, Portland, Dorset. *Enquiries:* to warden. *Accommodation* (for 16): per night including evening meal, 7s. per night when meal not supplied. *Travel:* train to mouth; bus to Portland Bill.

gnes Bird Observatory, Isles of Scilly. *Enquiries:* J. L. F. Parslow, c/o The Edward Grey tute, Botanic Garden, Oxford. *Accommodation* (for 7): 4s. 6d. per night. *Travel:* R.M.V. *nian* and R.M.V. *Queen of the Isles* (52s. 6d. return) or B.E.A. helicopter (approx. £4 return) . Penzance to St. Mary's; or light aircraft from Plymouth, Exeter, etc.; launch from St. 's to St. Agnes (4s. return).

lwich Bay Bird Observatory, Kent. *Address:* No. 1 Bungalow, Old Downs Farm, Sand- Bay, Kent. *Enquiries:* J. N. Hollyer, at above address. *Accommodation:* 5s. per night. *l:* train to Sandwich; 1½ miles to observatory.

kholm Bird Observatory, Pembrokeshire. *Warden:* Christopher Britton. *Enquiries:* den, Dale Fort Field Centre, Haverfordwest, Pembrokeshire. *Accommodation* (for 10): £9 10s. week (full board). *Travel:* train to Haverfordwest; car and boat to island (20s. return).

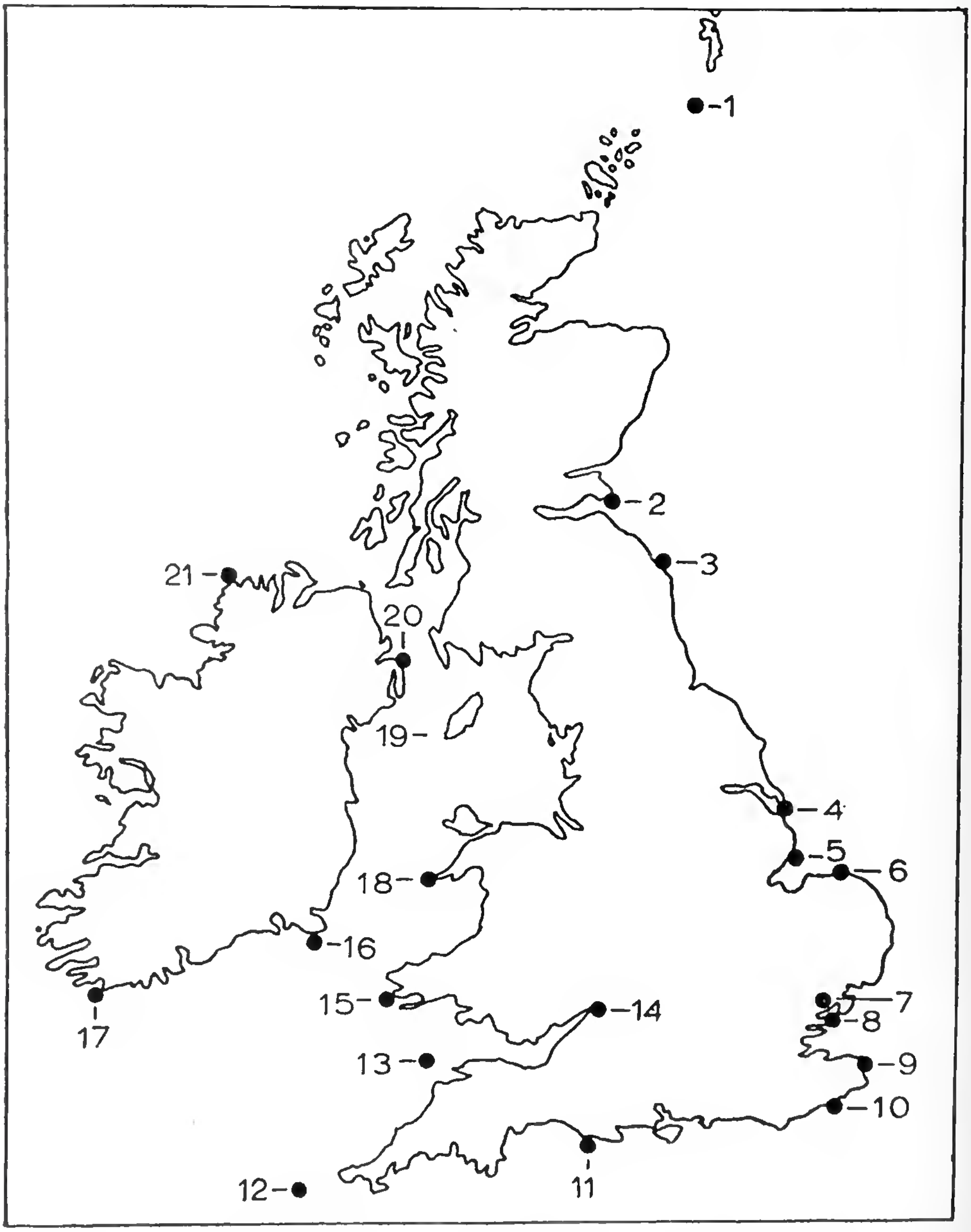
n Bird Observatory, Yorkshire. *Warden:* Barry R. Spence, Spurn Observatory, Kilnsea, Patrington, Hull, East Yorkshire. *Enquiries:* to warden. *Accommodation* (for 17): 5s. per (4s. to Y.N.U. members). *Travel:* train to Hull or Patrington; bus or taxi to Kilnsea.

(continued overleaf)

Tory Island Bird Observatory, Co. Donegal. *Enquiries:* R. G. Pettitt, 16 Chilberton Road, Merstham, Surrey. *Accommodation:* 20s. per week. *Travel:* train to Londonderry or Strabane; bus to Magheroughty; boat to island (20s. return).

Walney Bird Observatory, Lancashire. *Warden:* W. Shepherd. *Enquiries:* E. F. Pithers, 74 Queen Street, Barrow in Furness, Lancashire. *Accommodation* (for 16): 7s. per night or £2 per week (reductions for students).

In addition to the above observatories, there are several which have not yet applied for formal recognition. Enquiries concerning such stations may be made through the Migration Research Officer, Beech Grove, Tring, Hertfordshire.



Map to show positions of bird observatories and two other ringing localities whose co-ordinates are omitted from the body of the 'Report on bird-ringing'

1	Fair Isle	6	Cley	11	Portland	16	Great Saltee
2	Isle of May	7	Abberton	12	St. Agnes	17	Cape Clear
3	Farne Islands	8	Bradwell	13	Lundy	18	Bardsey
4	Spurn Point	9	Sandwich Bay	14	Slimbridge	19	Calf of Man
5	Gibraltar Point	10	Dungeness	15	Skokholm	20	Copeland

21 Tory Island

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(2) scientific nomenclature under generic names only (following the 1952 B.O.U. *Check-list of the Birds of Great Britain and Ireland*, but without strict adherence to original orthography and amended as in *Ibis*, 98: 157-168 and 99: 369);

(3) authors of all papers, notes, reviews and letters, and photographers; papers are referred to by their titles, other contributions as 'note on', 'review of', etc.;

(4) a few subject headings, i.e. 'Breeding', 'Display', 'Field-characters', 'Food', 'International Ornithological Congress', 'Migration', 'News and comment', 'Obituaries', 'Recent reports', 'Requests for information' and 'Voice';

(5) 'Reviews', which are listed together under this heading in alphabetical order of authors reviewed.

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